MEDICATION COMPLIANCE AMONGST MANIC-DEPRESSIVE OUT-PATIENTS

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ABSTRACT

This thesis reports research carried out to test the validity of using an interactional model to study medication compliance amongst manic depressive out-patients.

A questionnaire was developed and administered to 64 subjects. Interviews were subsequently conducted with the doctors of the subjects to confirm the information obtained from the questionnaires.

A number of subject characteristics and/or attitudes were found to be more significant than others in determining compliance/noncompliance. Frequently these variables had to be combined before significant results emerged, indicating that compliance is determined primarily by an interrelationship of variables rather than simply by isolated variables.

The results of the research provide strong support for the use of an interactional model in the study and understanding of medication compliance.

CHAPTER 1

INTRODUCTION

Why do some individuals faithfully follow professional health care advice while others do not? This question has raised more problems than it has solved, with numerous reasons having been hypothesised in the process.

Known otherwise as the problem of health care compliance it has been described as "one of the least understood yet most guessed about topics in health care" (Haynes, 1976, p.3). Here it forms the basis for the present review and study which focuses upon lithium compliance by manic depressives.

Despite the existence of health care noncompliance for centuries, it has only recently become a popular topic for research with publications roughly doubling every five years between 1956 and 1975 (Blackwell, 1976). Increased interest in the early 1960s has been attributed to: 1) greater recognition and availability of effective medical treatments, 2) a greater awareness of patients' rights, 3) a decline in professional paternalism, 4) a closer analysis of drugs already available caused by a slowing down in the discovery of new drugs, and 5) increased interest in the benefits of long term prophylactic drug maintenance (Blackwell, 1976; Haynes, 1979a).

Health care compliance behaviours are fundamental if effective treatment results are desired. With the exception

of very few instances, noncompliance generally produces negative medical and economical consequences for both the patient and health care system (Dracup & Meleis, 1982). Despite these adverse repercussions, noncompliant health behaviours are widespread. Reviews report average levels of noncompliance ranging from 15 to 50% with the occasional level as high as 90% of the individuals studied (M.S. Davis, 1966; Jamison & Akiskal, 1983; Marston, 1970; Sackett & Snow, 1979; Stimpson, 1974).

Kasl (1975) categorised health care compliance behaviours into 4 categories: "a) entering into or continuing a treatment program, b) keeping follow-up or referral appointments, c) taking prescribed medication and d) restricting or changing one's activities including smoking, diet and exercise" (p.6). Due to the immensity of the literature published on health care compliance, per se, the review to follow will focus primarily on Kasl's third category, patient compliance with prescribed medication regimens. Where applicable the review will focus upon the compliance literature associated with lithium carbonate and manic depression, in preparation for the study to follow.

More comprehensive reviews and annotated bibliographies covering a more extensive study of health care compliance are available for those who may be interested (Barofsky, 1977; Blackwell, 1982; Eraker, Kirscht & Becker, 1984; Evans & Spelman, 1983; Haynes, Taylor & Sackett, 1979; Kasl, 1975; Marston, 1970; Masur, 1981; Sackett & Haynes, 1976; Stimpson, 1974).

CHAPTER 2

LITERATURE REVIEW

Lack of patient compliance with recommended health regimens is recognised as a major complicating factor within the medical profession (Blackwell, 1976). Keeping in mind the potentially detrimental implications and influence of this behavioural problem, the present chapter reviews the definition, history, extent of the problem, methods used for measuring compliance, and the determinants and theoretical approaches associated with compliance research. Finally there will be a brief description of the purpose behind the choice of topic chosen for the compliance study outlined.

2.1 COMPLIANCE AND ADHERENCE DEFINED

Patient co-operation, adherence, acceptance, participation and therapeutic alliance are but a few of the terms used to represent patient compliance. These terms convey positive connotations while other terms such as refusal, disobedience, abuse, deviation and default, convey more negative connotations. Unfortunately a review of past literature indicates a great deal of confusion about the term compliance with many alternative terms being used inconsistently (Linden, 1981).

This review and study will use the terms compliance and adherence interchangeably to refer to "the extent to which a person's behaviour (in terms of taking medications, following diets, or executing lifestyle changes), coincides

with medical or health advice" (Haynes, 1979a, p.1). This is becoming a commonly used definition in recent compliance literature and hopefully indicates an increasing trend towards the standardisation of terms and measurements. The definition as originally intended is nonjudgemental.

Blackwell (1976) further categorised medication non-compliance into four types of errors: 1) errors of omission, where the individual fails to fill the prescription, or having done so fails to take the drug; 2) errors of dosage; 3) errors of purpose, where the individual takes the medication for the wrong reasons; and 4) mistakes in timing or sequence.

2.2 HISTORY

The phenomenon of patient noncompliance with health care advice was documented as far back as 20 centuries ago when Hippocrates wrote, "[the physician] should keep aware of the fact that patients often lie when they state that they have taken certain medicines" (as quoted by Haynes, 1979a, p.3). The issue gained little further attention until the early 1960s when research into patient compliance increased dramatically. This culminated in the publication of two major comprehensive reviews and references on the topic by Sackett and his colleagues - 'Compliance with Therapeutic Regimens' (Sackett & Haynes, 1976) and 'Compliance in Health Care' (Haynes et al, 1979).

The increased attention presently being given to compliance is consistent with current trends in medicine. These indicate an increase in lifestyle diseases - primarily

resulting from neglect of our bodies, e.g. heart disease, cancer and strokes; and the decrease of infectious-type illnesses, e.g. diptheria, smallpox and bacterial pneumonia (Jay, Litt & Durant, 1984).

2.3 THE EXTENT OF THE NONCOMPLIANCE PROBLEM

Although our understanding of the problem is limited there is no doubt about the existence of patient noncompliance. Reviews of numerous studies report noncompliance rates of between 16% and 90% with health care appointments; 22% and 40% with prescribed short term medications, and 6% and 67% with prescribed long term medications (Becker & Maiman, 1980; Blackwell 1973; Haynes, et al 1979; Van Putten 1975).

Not only do problems arise for the noncompliant individual but other problems and increased pressures fall on the health care services. Outpatient visits and unnecessary hospitalisations increase, while doubts arise about the efficacy of treatments and therapies. Baastrup (as noted by Van Putten, 1975), for example suggests that up to 75% of all relapses among patients on lithium may be accounted for by negligence. Subsequently more time, energy and money is wasted in futile searches for more 'effective' treatments while the problem itself lies unresolved with the patient. Stason and Weinstein (1976) recognised this problem and proposed that a greater allocation of funds spent on improving adherence to antihypertensive regimens would reduce disability and/or death resulting from hypertension to a greater extent than the same expenditure used in the detection and treatment of new cases of hypertension.

Compliance is also an extremely important but often overlooked variable in clinical outcome studies where the effectiveness of various treatments are compared and contrasted (Feinstein, 1979; Lipman, Rickels, Uhlenhuth, Park & Fisher, 1965).

Noncompliance then is a widespread problem which results in the inefficient use of health care services. When unidentified it has the potential to call into serious question the efficacy of otherwise effective clinical therapies and treatments.

A survey of the lithium literature indicates that noncompliance ranges from 20 to 52%, consistent with non-compliant levels found in studies of other long term medications. Of six studies reviewed by Van Putten (1975), non-compliance ranged between 20 and 30%. Since then Jamison, Gerner and Goodwin (1979) have reported 47% of individuals on lithium stopping it at least once against medical advice, while Kucera-Bozarth, Beck & Lyss (1982) reported 52% of 33 individuals on lithium (not all manic depressives), non-compliant with their medication.

2.4 METHODS FOR MEASURING COMPLIANCE

Medication compliance can be assessed using either direct and/or indirect methods. Direct methods involve the identification of the drug in the blood or urine of the patient. In contrast, indirect methods involve assessments by either the patient or other significant people, pill counts or outcome assessments to help determine whether or not the individual has taken his medication.

Major difficulties arise when interpreting compliance data and especially when comparing compliance studies because of differences in the operational definitions of compliance across studies (Evans & Spelman, 1983). Some differences reflect the variety of behaviours under study, e.g. compliance with medication as against compliance with diets or exercise. Other differences, however, result from the use of different methods and standards when measuring compliance of the same behaviour. Direct and indirect measurements of medication compliance for example will frequently produce different results. Direct measures are generally acknowledged to produce higher noncompliance figures than indirect measures, but as Blackwell (1976) proposes, "none of the methods of detecting or studying nonadherence are without shortcomings or difficulties" (p.516).

The section to follow investigates the variety of techniques used to measure compliance with medication, including a brief discussion of the various methodological problems present in each.

2.4.1 Direct Measures of Compliance

The shortcomings present with all direct measures of compliance, by their very nature are similar, and so will be discussed at length after a short description of each type of measure.

2.4.1.1 Blood Level Monitoring

The concentration of a drug or its metabolites in the blood is used as an indication of the ingestion of a specific medication by an individual. This technique is especially

useful for estimating dosage consumed when a clear relationship exists between the medication dosage and a steady state blood level. When substances are difficult to identify in the blood, marker compounds may be added to the medication to assist with its monitoring.

Blood level monitoring of lithium levels became popular with the development of adequate serum lithium monitoring techniques around 1952 (Coombs, Coombs & Mee, 1975). Although the relationship between medication dosage and blood lithium levels is not clear using this method, its usefulness increases with the demonstration of a definite relationship between lithium levels and the nature of the clinical response - namely the onset of side effects and toxic reactions (Johnson & Cade, 1975). It is important to remember with respect to lithium management, that it is not the dosage but the lithium blood level which matters, so that what might be a therapeutically inadequate dose for one person may be potentially lethal for another.

2.4.1.2 Measurement of Urine Excretion

Techniques have also been developed which identify certain drugs in an individual's urine. Once again this involves identification of either the drug itself, its metabolic by-products or marker compounds. The measurements are then used to identify compliance.

The presence of lithium in urine can also be measured using the same apparatus as that used with blood level monitoring. Unfortunately urine lithium estimates are reported to be less accurate than serum levels. This is due to greater variations in urine concentrations amongst

people which ultimately affects the final lithium measurement. Consequently serum lithium levels are a preferable lithium measurement to urine lithium estimates (Amdisen, 1975).

2.4.1.3 Other Methods

Other direct methods of measuring compliance have included an attempt to detect medication tracers in the stools of psychiatric patients (Blackwell, 1976), the development of a breath test to identify certain medications, e.g. disulfiram (Masur, 1981), and the development of techniques to identify certain medication in saliva (Jay et al 1984).

The latter method has also been used in a variety of experimental analyses of lithium which have included analyses of capillary blood samples, erythrocytes, cerebrospinal fluid and the tissue of normal body organs. Since each of these methods has only been tested once or twice it would be premature to make any general conclusions other than to say there is still more room for research (Coombs et al, 1975).

2.4.1.4 Problems and Limitations of Direct Measures of Compliance

Blood level and urine excretion tests are regarded as two of the most objective procedures used for measuring patient compliance with medication. The accuracy of these methods however is affected by a number of factors. These include: 1) pharmacokinetic variations, 2) the period of time the individual has been using the medication and 3) the effect of repeated measures upon compliance.

1. Pharmacokinetic Variations

This refers to the individual differences which occur in the absorption, distribution, metabolism and excretion rates of different medications. This in turn is affected by the different rates of absorption according to the formulation of the drug, with syrup forms being absorbed much faster than coated tablets (Gordis, 1979). Lithium for example comes in two different preparations, the first of which is available as a tablet of 250 mg of lithium. The second preparation is a sustained release tablet equivalent to 400 mg of lithium which is released slowly over a period of several hours (Martindale, 1972). The absorption of medication is subsequently affected by interactions with other medication, interferences by food and individual genetic differences in the metabolism and excretion of medication.

A review of the literature by Gordis (1979) indicated that genetic determinants played an important part in the metabolism of drugs, graphically illustrating the vast individual differences which occurred within the studies reviewed.

Of equal importance is the excretion pattern of the drug, metabolite or tracer being detected. A positive test will indicate that the medication has been ingested within the excretion time range but does not guarantee anything about, before or after this interval. In contrast a negative test may simply indicate that the drug has been rapidly excreted and therefore can no longer be detected.

With respect to lithium the literature reports that lithium is readily absorbed when administered orally and peak

plasma concentrations occur two to four hours after ingestion (Martindale,1972). A further review of the literature exposed two case studies of noncompliant manic depressives on lithium who just prior to their scheduled serum lithium levels consumed unusually large quantities of lithium, making them appear faithfully compliant (Schwarcz, 1980). Keeping this in mind it seriously undermines the use of serum lithium levels as an accurate measurement of compliance.

To overcome this problem Schwarcz (1980) proposed that spot lithium checks should be used more regularly. Gengo, Frazer, Ramsey, and Mendels (1980) are also aware of this problem but suggest instead that the measurement of the erythrocyte concentration of lithium may improve the accuracy of assessment. Having also been tried by Frazer et al (1978), the results of both studies are encouraging and indicate a possible solution to the problem. Using this measurement lithium would have to be taken for 3 or 4 consecutive days prior to testing for the lithium ratio to be at a steady state.

The above-mentioned problems with lithium highlight the need to examine carefully the various pharmacokinetic characteristics of any medication under investigation when assessing patient compliance. Failure to do so may otherwise affect compliance rates by inadvertently lowering the drug analysed and incorrectly assessing compliance. For these reasons Biggs, Chang, Sherman & Holland (1976) seriously question the value of using direct measures to determine the degree of compliance. They also emphasise that in the majority of studies to date which have incorporated direct

measures, it has not always been clear whether it has been the variations in compliance or variations in the bioavailability of the drugs prescribed and taken, that have been identified. The caution expressed by Biggs and his colleagues is reiterated by Gordis (1979). He warns that the failure to consider pharmacokinetic variations associated with the patient and the drug preparation, could create serious errors in inference regarding compliance levels among different groups of patients.

2. Period of Time Using Medication

In a review of various studies, Gordis (1979) found that depending upon the particular drug in question, the period of time an individual has been using the medication can affect the metabolism of it. The metabolism of some drugs therefore will be enhanced the longer an individual has been using it, substantially decreasing the blood level of the drug. However, for other drugs the metabolism is inhibited the longer it is taken, increasing blood levels of the main compound.

Very little has been reported about the effect of time spent on lithium in relation to metabolic rate. Johnson and Vacaflor (1975) however, reviewed two articles which suggest that the weight gain reported by many individuals on lithium may be attributable to a decrease in overall metabolic rate secondary to reduced thyroid functioning. If this is the case one might expect that serum lithium levels would increase the longer it is prescribed.

3. Repeated Direct Measures

The effect of repeated direct measures on compliance measurements has become more and more controversial with the increased interest shown in compliance studies. Some researchers encourage the use of repeated measures for methodological reasons while others doubt its practical usefulness because of reactive effects it may have on compliance levels.

Blackwell discourages the use of isolated spot checks, but admits that, "unlike the placebo response, which increases with attention paid to people, poor adherence tends to disappear under scrutiny" (Blackwell, 1976, p.514). Other researchers believe that although theoretically, repeated measures should provide a more reliable and valid measurement, in fact they inadvertently give a false indication of the level of compliance by temporarily increasing it (Evans & Spelman, 1983; Marston, 1970).

These opinions reflect the confused findings of a variety of studies investigating the effect of repeated direct measures on compliance. Some report that compliance measurements inferred from urine specimens collected during unannounced home visits correlate well with those obtained at the time of clinic visits (Gordis, Markowitz & Lilenfeld, 1969a). Meanwhile others report that noncompliance is higher for specimens collected in unannounced home visits than those collected at clinic visits (Marrow & Rabin, 1966). On the other hand Maddock (1967) found no difference in the proportion of negative tests for specimens collected either in the clinic or during unannounced home visits.

Direct measures are also subject to the problems which arise when comparing compliance studies. Some investigators will estimate compliance from the results of one blood or urine specimen while others will base their estimates on repeated measures. Then with studies of repeated measures the operational definitions of compliance will differ according to the varying portions of positive or negative test results obtained.

Frequently when single tests are used there is a tendency for the classification of individuals to be dichotomous, either complier or noncomplier, with no gradations. When multiple tests are used, one can define various levels of compliance, which some studies have shown may vary throughout the course of treatment (Gordis & Markowitz, 1971).

To conclude this section on direct measures, although they appear to be more methodologically sound and ultimately more favourable because of their objective nature, many of the issues discussed previously are unacknowledged or simply not discussed in studies using these measures. Consequently care should be taken when interpreting or comparing studies using only direct measures of compliance.

2.4.2 Indirect Measures of Compliance

2.4.2.1 Therapeutic Outcome

Assuming the medication is effective, some studies have used the degree of improvement in a patient's condition as an indication of whether or not the individual has been compliant with his or her medication (Markowitz,1970).

Acceptance of this technique assumes that improved patient outcome is mediated only through compliance with the specified medication regimen. It overlooks the influence of extraneous variables, i.e. spontaneous remissions, multiple treatments, socioeconomic or cultural factors upon improvement, not to mention that total compliance does not necessarily guarantee treatment success. Individuals may also be the victims of an inaccurate diagnosis which this method does not allow for (Gordis, 1979; Sackett, 1976).

Except for behavioural interventions where treatment effects can be manipulated through ABA reversal designs, therapeutic outcome is not considered a valid or reliable independent measure of patient compliance (Sackett, 1976b). However, used in combination with other measurements, it may enhance the validity of the compliance measurement.

Despite its inadequacies as a research technique, therapeutic outcome can be useful in clinical settings where it may be impractical to assess the compliance of all patients in any other way. Assessments could then be directed more efficiently and appropriately towards those who fail to reach the therapeutic goal (Gordis, 1979).

A similar measure to therapeutic outcome is that of noting the presence or absence of side effects which occur consistently with some drugs. The disadvantages of this technique are similar to those of therapeutic outcome. In addition it overlooks unreliable reporting of side effects by patients (Evans & Spelman, 1984).

2.4.2.2 Patient Self-Report

Patient self-report basically involves asking either directly or indirectly, whether or not patients have been complying with their medication.

A number of studies evaluating medication compliance have attempted to document the accuracy of interview data by comparing it with more objective measures. A review of the literature indicates discrepancies ranging from 8 - 36% when self-report has been compared with urine measurements and pill counts (Feinstein et al, 1959; Gordis, Markowitz & Lilienfeld, 1969b; Park & Lipman, 1964; Wilcox, Gillan & Hare, 1965). The discrepancy in each case pointed towards an overestimation of compliance by self-report.

When questioning patients about their compliance, if asked in a nonthreatening nonjudgemental manner, it is thought about half the noncompliant patients will admit to missing at least some of their medication (Jay et al, 1984). It is estimated that of those who confess to missing medication, on average they will overestimate the extent of their compliance by about 20% (Haynes, 1982).

While a discrepancy exists between self-reports of compliance and other measures, a close correspondence has been found between self-reports of noncompliance and some measures (Feinstein et al, 1959; Park & Lipman, 1964). There is little evidence of compliers misrepresenting themselves as noncompliers, although Kucera-Bozarth et al (1982) reported that 9% of a sample of 37 reported themselves as noncompliant when lithium levels suggested they were compliant. Nevertheless the major problem with self-report would seem to be correctly identifying the noncompliant patient who claims to have complied (Gordis, 1976).

Used prior to the implementation of intervention strategies for improving compliance, self-report was a useful technique for indicating success. Sackett (1976b) found the only patients who responded favourably to efforts to improve compliance were those who initially admitted to being noncompliant.

2.4.2.3 Assessment of Compliance by Significant Others

Mothers, relatives, doctors and nurses have all been studied by researchers to determine how accurately they can assess medication compliance by someone they have contact with either personally or professionally.

A review by Gordis et al (1969a) reported that when mothers' assessments of their children's compliance with prescribed penicillin were compared with urine measures, numerous discrepancies were found. These discrepancies ranged from 14 - 31% with each assessment overestimating compliance. Meanwhile another study assessing the degree to which mothers followed through on doctor's advice, primarily on the basis of responses to interviews, found only 11 discrepancies out of 129 instances where pill counts were compared with the interview assessments. In all 11 instances the pill count indicated noncompliance while the interview implied compliance. Although encouraging, the interpretation of these results is limited by the selection of the individuals involved.

Relatives are often unable to accurately rate the degree of medication compliance by an individual. Some genuinely do not know, while others possibly responsible for the noncompliant medication administration are not willing

to admit it (Evans & Spelman 1984). Asking relatives is therefore considered unreliable.

Despite doctors' increased awareness of the problem of noncompliance, their ability to detect it is very unreliable (M.S. Davis, 1966). Studies indicate that the more senior the doctor, the more likely he or she will be to overestimate compliance in his/her patients. Meanwhile junior doctors, although more accurate have no more than a 50% chance of identifying noncompliance (Caron & Roth, 1968; Gordis, 1979; Mushlin and Appel, 1977). Haynes (1979b) proposed that the inability of the doctors to identify noncompliance was in line with conclusions from various studies that there were no readily observable characteristics of patients with poor compliance that allowed their easy identification. Other studies which support the inadequacy of doctors' assessments of compliance include: Charney (1972), Kasl (1975) and Paulson, Krause and Iber (1977).

Nurses' assessments of compliance are also regarded as unreliable. This is largely due to the difficulty which exists for nurses in determining whether or not patients have actually swallowed their medication. Observations made by nurses in one study identified 1.7% of their patients were noncompliant whereas urine tests indicated 7.9% of the same patients to be noncompliant (Ballinger, Ramsey & Stewart, 1975).

2.4.2.4 Pill Counts

Pill counts involve either counting the tablets left in one's bottle, measuring and/or weighing liquid

solutions or counting empty medication bottles. The amount of medication remaining is then compared with the amount that should be remaining and any discrepancies between the two are noted. Alternatively a check can be made of when patients return for a repeat of their medication in relation to the expected time.

This measure of compliance makes the assumption that absent medication has been taken as prescribed. Failure to return medication however does not guarantee that it has been appropriately used by the patient.

Opinions of researchers evaluating the adequacy of pill counts as a measurement technique reflect the inconsistent findings of studies reviewed. Some researchers maintain that pill counts are no more accurate than self report with noncompliers either failing to bring their pills to be counted or altering the amount of medication in the container to reflect better than actual compliance (Blackwell, 1976; Jay et al, 1984).

In contrast, other researchers feel more positive about the adequacy of pill counts. One study comparing bottle counts with blood bromide levels found a moderately high correlation of .8 between the two measures (Roth, Caron & Hsi, 1970). Similarly when urine tests were compared with pill counts amongst 19 patients taking imipramine it was found that only 3 patients had negative urine tests when pill counts indicated compliance (Porter, 1969). Finally Park and Lipman (1964), demonstrated that while 15% of their patients reported noncompliance, a pill count identified a 51% deviation.

When Blackwell (1976) discriminated between compliance errors of omission and commission, he suggested that compliance problems could be more accurately identified using pill counts, by giving an individual a greater amount of medication than necessary. Compliance would then be assessed according to the amount of medication left in relation to the overall treatment regimen and the amount of medication originally dispensed. This method was used by Lipman et al (1965) during a clinical trial to determine the effectiveness of a certain drug. Unfortunately, despite the conclusion that 45.7% of the sample had taken 75% or less of the medication recommended, no mention was made of patients who may have taken more than the recommended amounts.

Similar to other compliance measurements, pill counts are also susceptible to varying operational definitions of noncompliance. Just as investigators differ in their operational definitions of what proportion of negative excretion tests are necessary before defining noncompliance when using direct measures, so too do researchers using pill counts differ in the magnitude of pill count deviations permitted before defining noncompliance (Marston, 1970).

The validity of pill counts is weakened dramatically when the prescription medication is of a type that might be used by other family members, where leftover medication might be available to use instead, or when prescription drugs may be obtained from others. In line with these criticisms, a detailed review by Gordis concluded by seriously questioning the validity of pill counts as an indirect measure of

compliance (Gordis, 1979).

2.4.2.5 Other Indirect Methods of Measurement

2.4.2.5.1 Medication monitors

Special medication monitors have been developed in an attempt to estimate pill taking practices as objectively as possible. They involve a specially prepared dispenser which holds individually wrapped and date labelled tablets stacked in sequence. Each pill wrapping is designed to trigger off the detection of radioactive sources within the dispenser itself. Consequently when the dispenser is returned, the researcher can determine whether or not the pills have been steadily removed at regular intervals, or whether multiple doses have been removed from the dispenser simultaneously (Moulding, 1971, 1979, as outlined by Masur, 1981, p.447).

Apart from being very expensive, this method has the same problem as pill counts in that one cannot guarantee that the absent pills have been properly taken.

2.4.3 Conclusion of Methods for Measuring Compliance

Summarising this section, an important point to keep in mind is that all the methods used to operationally define and measure compliance as reviewed here have limitations and inadequacies.

Direct methods including blood and urine measures, despite being the most objective procedures, have individual biological and genetic complications which interfere with the accuracy of assessment. Although they are factors which should be considered and made allowance for, they are

frequently unacknowledged in the majority of studies using these methods.

Therapeutic outcome and the monitoring of side effects are two indirect measurement techniques neither of which are considered very reliable or valid for research purposes. Nevertheless they are both considered useful for practical purposes in the clinical settings.

Patient self-report and pill counts are both suspected of overestimating real compliance although are useful for identifying self-reporting noncompliers.

Assessments by significant others have proven unreliable and also subject to many of the inadequacies of self-report.

Other methods such as medication monitors have appeal but are disadvantaged by the factor of expense. More of the appeal is lost as one considers that despite its cost it does not guarantee to overcome the shortcomings of less expensive methods, i.e. pill counts.

APPENDIX TO CONCLUSION

After reviewing each method available for measuring compliance two major points seem significant.

1. The problem of no standard operational definition for medication compliance. This is a complicated problem because the diversity of methods available for measuring compliance suggests it is unlikely one operational definition will ever dominate. Consequently one suspects that if research continues to progress in this area as it has done in the past, it may well necessitate subdivisions, defined

by measuring techniques. This would enable standard operational definitions within groups to evolve enabling more meaningful comparisons between studies to occur.

2. The accuracy of the various methods of measurement. Despite the limitations present with the direct methods used for measuring compliance, throughout the reviews the reported accuracy and validity of all the indirect measurements have been estimated by comparing their results with those of the direct methods. Very few questions have ever been raised about the validity of the direct measures. It may well be appropriate to ask which measure is validating the other.

2.5 MODELS AND THEORIES

Over two hundred variables have been studied in an attempt to help identify and predict individuals who may become noncompliant. Two extensive reviews of the variables studied were undertaken by Becker et al (1979); Haynes (1979b); Hulka (1979); and Jay et al (1984). In the review by Jay et al the variables investigated were categorised within three major theoretical approaches to health care compliance. An overview of these reviews will follow this structure outlining each major approach and summarising the most important conclusions.

Unfortunately inconsistency of findings amongst studies was common and made the task of drawing conclusions difficult.

2.5.1 Individualistic Models

These models represent the most common approach to

the study of health care compliance. They assume that non-compliant individuals possess unique characteristics that differentiate them from compliant individuals. Research based upon this assumption has attempted to identify such characteristics by noting individual factors that differentiate compliant and noncompliant individuals.

The approach incorporates what have otherwise been described as the medical model, control and learning theories (Dracup & Meleis, 1982). It focuses upon easily identifiable and quantifiable dimensions such as social, demographic and personality variables of the individual; the severity and duration of the disease; and the type, complexity, duration and discomfort of the prescribed regimen.

The most important conclusions drawn from research using this approach are summarised below:

1. Research has yielded an unsystematic multiplicity of findings that are frequently contradictory.

2. Of over twenty sociodemographic variables tested only age, in particular the very young and very old, shows a predominantly positive association with noncompliance Although other factors have results indicative of positive and negative associations with compliance each have substantially more studies reporting no significant findings.

3. With respect to disease related factors, mental disorders especially schizophrenia, paranoia and personality disorders tend to be negatively associated with compliance.

4. Increased symptomatology is negatively associated with compliance.

5. Increased disability is positively associated with compliance.

6. Parenteral drug administration, due to the direct nature of administration, is positively associated with compliance.

7. The longer the duration of treatment the more negative the effect on compliance.

8. The greater the number of medications and treatments prescribed, and ultimate cost, the greater the non-compliance.

9. The erring practice of some pharmacists who dispensed less medication than ordered was also negatively associated with compliance.

10. The introduction of safety containers was negatively associated with compliance.

(Haynes, 1979b; Jay et al, 1984; Masur, 1981)

The major criticism with the individualistic approach is its predominant emphasis upon patient characteristics and failure to consider the possible interactions between behavioural, psychological, environmental, structural, physical and/or medical variables.

2.5.2 Health Belief Model

Another major model proposed for the analysis of compliance is the Health Belief Model (HBM). It is a

theoretical framework developed during the early 1950s to help explain the likelihood of an individual undertaking a recommended preventive health action. Having undergone numerous modifications, currently the theory postulates that health behaviour is a function of the individual's perceptions of:

> 1) level of personal susceptibility to the particular illness or condition; 2) degree of severity of the consequences (organic and/or social) which might result from contracting the condition; 3) the health action's potential benefits or efficacy in preventing or reducing susceptibility and/or severity; 4) physical, psychological, financial, and other barriers or costs related to initiating or continuing the advocated behaviour. The HBM also stipulates that a cue to action or stimulus must occur to trigger the appropriate behaviour by making the individual consciously aware of his feelings about the health threat.
> (Becker et al, 1979, pp.78 and 81)

The HBM has been successfully applied to many compliance studies although many have also found little merit in the model (Becker et al, 1979). Jay et al (1974) reviewed a number of studies according to the particular component of the model the findings related to. The most important conclusions drawn from this review are summarised below:

1. Although a number of studies have found positive associations between patient's perceptions of their susceptibility to a particular disease and compliance with the prescribed medical advice, some studies have reported an inverse relationship. This raises questions about whether perceptions of susceptibility increase compliance, whether successful preventive health behaviours lower perceptions of susceptibility to disease, or both.

2. Data from research studying the relationship between perceptions of severity of illness and patient compliance with medical advice are inconsistent. Findings suggest that acceptance of medical advice and increased compliance can result from fear of a particular disease. However, very low or very high levels of perceived severity are unlikely to affect compliance.

3. The majority of research investigating individual perceptions of the benefits of conforming with medical advice have reported a significantly positive relationship between faith in doctor and compliance.

4. The perceived costs of compliance are many and level of compliance has been found to depend largely upon the perceived costs of compliance to each individual concerned. Costs may be financial, personal, health related, time related etc.

Despite empirical support for some of the components of the HBM, several criticisms have been made about it:

1. It overlooks the possibility that noncompliance may be unintentional, although this depends entirely upon how noncompliance is defined.

2. The model does not specify how social agents or cues to action influence patient motivation, how they occur or why they may fail.

3. Due to the subexperimental design of most studies the model is unclear about the causal nature of the link between health beliefs and compliance (Haynes, 1979b).

4. The degree of importance that health beliefs have on compliance over time are unexplained (Haynes, 1979b).

5. Like the individualistic models the HBM places too much emphasis upon the individual and not enough on the doctor-patient interaction (Jay et al, 1984).

2.5.3 Doctor-Patient Relationship

The third approach that Jay et al (1984) refer to is that of the doctor-patient relationship.

As noted from the previous literature reviewed, the tendency for both the individualistic models and health belief model to emphasise patient characteristics alone has been considered inadequate. This model was proposed to take into consideration the interaction of both the doctor and patient in their relationship together. Although it is a factor often referred to in the compliance literature very few studies have systematically investigated it.

The major findings of the few studies reviewed suggest that despite the characteristics of the patient, the behaviour of the health care provider can largely determine whether or not individuals will be compliant with their prescribed medical advice.

The most important conclusions drawn from the studies are summarised below:

1. A predominant variable is that of communication. Although inconsistent, the findings from studies generally indicate that where the communication is actively twofold and not merely passively received by one party, higher compliance is more likely.

2. When significant others are taking responsibility for the administration of medical advice on behalf of someone else,i.e. a parent administering medication to a child, the degree of friendliness or antagonism expressed by the doctor is significantly related to the compliance by the significant other.

3. The medication regimen is regarded as a major part of the doctor-patient interaction as it is traditionally initiated by the doctor and followed by the patient. Studies confirm previous findings that the more complex the regimen, and the less that is known about the function of the medication by the patient, the more medication errors are made.

4. When doctors engage in more extensive follow-up, and caringly but firmly encourage and motivate individuals not complying with medical advice, compliance is enhanced.

5. When the prescribing doctors give the impression that they believe in the efficacy and importance of the medication prescribed,compliance is increased.

The major criticism made by the few researchers who have used this model, is that the relevant aspects of the doctor-patient interaction have not yet been adequately defined (Hulka, 1979). The paucity of literature using this approach also means that more research must be undertaken before more definite conclusions can be made.

An attempt has been made to extend the doctor-patient relationship model by incorporating it within the framework of the interactionist model of compliance, described by Dracup and Meleis (1982).

2.5.4 Interactional Model

Disillusioned with the other approaches available at the time, Dracup and Meleis (1982) proposed a new model. Reflecting upon: 1) the extremely limited extent to which the variables categorised under the individualistic models could be modified, and 2) the degree to which responsibility for noncompliance was placed entirely upon the client by both types of models, Dracup and Meleis proposed the development of an interactional approach to compliance. This approach utilises role theory and considers in more detail the subsequent influence of environmental and social interactions upon medication compliance.

When developing the interactional model, Dracup and Meleis (1982), based their theory upon three assumptions:

1. Compliance was the outcome of a health transaction composed of roughly three stages. These stages included periods before, during and after any direct interaction between the doctor and patient. The third stage in particular represented the interval after the interaction when the patient either did or did not comply with the recommended advice.

2. Three conditions proposed by Sackett (1976b) concerning the necessity for (i) patient consent, (ii) accuracy of diagnosis and (iii) clinical efficacy of any proposed treatment; should be present before researching and/or experimenting with compliance/noncompliance.

3. Compliance could not be understood by considering patient characteristics alone, but must also examine the effect of the patient's interactions with significant others and his environment, upon compliance.

As a basic concept of role theory, 'role' refers to "a patterned sequence of learned actions or deeds performed by a person in an interaction setting" (Sarbin, 1954, p.225). Within this setting roles elicit two kinds of expectations: 1) expectations anticipated by one participant of an interaction (A), from the participant of the reciprocal role (B), and 2) obligations which A anticipates to direct toward B.

According to Lindesmith and Strauss (1968) role enactment involves four necessary elements: 1) self-concept, 2) performance of appropriate behaviour in given situations, 3) experience of complementary roles to help guide performance, and 4) periodic evaluation of the role by the individual and others in counter roles.

While role enactment outwardly involves the performance of certain behaviours, if a person lacks the necessary role expectations, acquired through experience, he will be unable to enact the role.

Based on these considerations, the interactional model isolates four main components which it considers in relation to levels of compliance/noncompliance. These include:

1. The behaviours incorporated within the compliant/noncompliant act as required by a new role. With respect to health care this may involve excluding previously familiar behaviours (e.g. smoking, eating certain foods) and/or learning new behaviours (e.g. taking regular medication, undertaking daily exercise).

2. One's self-concept, focusing especially upon any changes incurred during the transition from a well role to a sick or at risk role.

3. The influence of counter roles played by significant others, e.g. health professionals and spouses.

4. The evaluation periodically of roles as performed by oneself and others in counter roles.

Therefore an individual compliant with health regimens would typically identify himself with a compliance role, using available cues and behaviours of the proposed role and cues received from others to perform the appropriate role. He would then also evaluate himself and others according to that role.

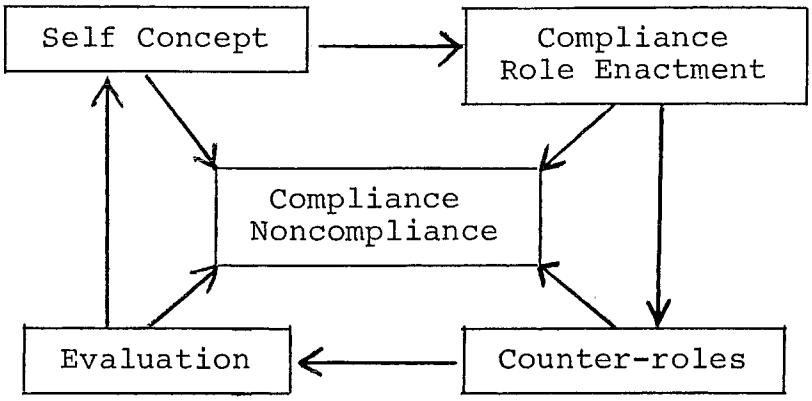
Based upon these components the model proposes seven potential hypotheses:

> 1) To the extent [that] a client demonstrates knowledge and competency in enacting a proposed role, a higher level of health regimen is expected. The relationship is mediated through the level of complexity and duration of the medical regimen...
>
> 2) Competency is maximised when there is evidence that the sick or at risk roles have been incorporated into the self-concept of the client...
>
> 3) Compliance is enhanced when relevant other roles are congruent and/or complementary with client roles...
>
> 4) Compliance is enhanced if the compliance role is reinforced by significant others and other reference groups...
>
> 5) The level and extent of a client's compliance with a health care regimen depends on the degree to which behaviours of compliance are judged valuable by the client and are validated by significant others...
>
> 6) Nursing interventions directed toward increasing compliance depend on a careful assessment of omissions or commissions in each of the four proposed components of role enactment...

(7) All four components of role enactment have to be present for compliance to occur. (Fig. 1).

Dracup & Meleis, 1982, pp.34, 35)

Fig. 1. Compliance: The Proposed Interactionist Conceptualisation



Note: From "Compliance" An Interactionist Approach" by K.A. Dracup and A.I. Meleis, 1982, Nursing Research, p. 31.

To date the study of lithium compliance amongst manic depressives, has been characteristic of the individualistic approach, focusing upon the discovery of variables to distinguish compliers from noncompliers. Jamison and Akiskal (1983) reviewed these variables and a summary of their findings follows:

1. Demographic variables - few demographic variables have reliably predicted lithium compliance. Only three variables have shown a relationship:

(a) patients with prior histories of mania tend to be less compliant than those with a prior history of hypomania;

(b) increasing age and a greater number of effective episodes requiring treatment were associated with increasing compliance. This suggests that increased

compliance may be secondary to decreasing denial as the illness continues to recur; and

(c) the number of months on lithium significantly differentiates the compliant from the noncompliant, with more people discontinuing lithium during long term treatment - a finding consistent with other compliance studies.

2. Missing of highs - this factor significantly differentiated compliant from noncompliant patients. A further study reported that noncompliance was associated with elevated mood although the direction of causality was not specified.

3. Side effects - findings suggest the occurrence of side effects may not be as important in lithium non-compliance as is commonly thought.

4. Decreased insight, when individuals feel well and see no need for further medication, has been found to be significantly related to lithium refusal.

As isolated instances in a number of cases the majority of these findings need to be repeated to help ascertain their validity and accuracy.

Jamison and Akiskal (1983) concluded by advising doctors treating manic depressives to become more aware of the effect an interaction of sociocultural, patient, illness and medication variables could have on lithium compliance.

2.5.5 Conclusion

Until the development of the interactional model of compliance in 1982, the three prevailing approaches

included: 1) the individualistic model, 2) the health belief model, and 3) the doctor-patient relationship.

The most common approach to the study of health care compliance has been the individualistic models. Assuming that compliant and noncompliant individuals can be differentiated by quantifiable and identifiable characteristics alone, the models generated much research comparing numerous variables with compliance. Results from studies using this approach have produced inconsistent findings.

The HBM also generated much compliance research, postulating that an association existed between health behaviour and individuals' perceptions of themselves in relation to their disorders. Study findings using this model have also been inconsistent.

In opposition to the strong emphasis these two approaches placed on the individual taking full responsibility for noncompliance, some researchers turned to investigate how the doctor-patient relationship might influence compliance. Theorising that the behaviour of the health care provider could greatly influence compliance, the model proposed that doctors should take a greater responsibility for a patient's noncompliance. Although still in need of revision and additional research, a review of the majority of research findings investigating the DPR support its hypothesis.

With similar feelings towards the individualistic and HB models, Dracup & Meleis (1982) developed the interactional model, encompassing and expanding upon the principles of the DPR theorists. Based upon role theory

the interactional model considers the influence of environmental and social interactions upon compliance. However, as a relatively new model it is still in need of much study.

To date, the study of lithium compliance amongst manic depressives has focused upon discovering variables which might distinguish compliers from noncompliers. A few findings show a relationship to lithium compliance, although the majority of these need to be repeated to determine their validity and accuracy.

2.6 RATIONALE

The literature reviewed points to a need for additional research into compliance using a model that investigates the effects of interactions upon compliance. The interactional model subsequently serves as the theoretical basis for the study to follow which examines lithium compliance by manic depressive outpatients.

Manic depressives and lithium compliance have been chosen for several reasons:

1. Lithium has become a popular form of treatment for manic depression, having been universally acknowledged for its prophylactic effectiveness (J.M. Davis, 1976; Petursson, 1979; Prien & Caffey, 1977; Quitkin, Rifkin & Klein, 1976; Schou & Thomsen, 1975).

2. Being an effective prophylactic treatment lithium is usually prescribed on an exceptionally long term or life-long basis.

3. The consequences of lithium nonresponsiveness amongst manic depressives and inadequately or untreated manic depression, are typically associated with recurrences of symptoms and hospital readmissions. This may lead to occupational, financial, personal and emotional disruptions (Connelly, Davenport & Nurnberger, 1982; Jamison & Akiskal, 1983).

4. The consequences of lithium noncompliance are as profound and destructive as lithium nonresponsiveness with the exception that noncompliance is reversible.

5. Lithium noncompliance is common and is a particularly frustrating clinical problem. Up to 75% of all relapses among patients on lithium are attributable to negligence, i.e. noncompliance (Baastrup as noted by Van Putten, 1975).

As reviewed earlier, a survey of the lithium literature indicates that noncompliance amongst individuals ranges from 20 - 52%, a finding consistent with non-compliant levels reported in studies of other long term medications.

The following study investigates lithium compliance/noncompliance using the interactional model as a basis. It examines variables with a greater capacity for modification than those proposed by the individualistic models. In addition it also allows for a greater sharing of responsibility for lithium noncompliance than either the individualistic or health belief models.

2.7 HYPOTHESES

The hypotheses as they stand are very loose and nonspecific. Having now defined the study and sample to be worked with, it is appropriate to review the hypotheses, redefining and elaborating upon each as it relates to the study.

Of the seven hypotheses proposed by Dracup and Meleis (1982), and quoted earlier, six are tested in the study. The seventh hypothesis which refers to nursing interventions was not tested because of its inappropriateness to the outpatient sample being studied.

All variables extracted from the hypotheses were used as a basis for the creation of questionnaire items.

Hypothesis 1: "To the extent [that] a client demonstrates knowledge and competency in enacting a proposed role, a higher level of health regimen compliance is expected. The relationship is mediated through the level of complexity and duration of the medical regimen " (Dracup & Meleis, 1982, p.34).

The proposed roles the authors are referring to in the above extract are the 'sick' and 'at risk' roles. The 'sick' role is associated with the diagnosis of a disease or illness. Behaviours of compliance in this instance are comparable to an individual agreeing to follow behaviours prescribed in a medical regimen to help overcome an illness. In contrast the 'at risk' role is associated with the need to prevent the possible recurrence of a certain disease or disorder. Behaviours of compliance in this instance are comparable to an individual recognising his risk for

developing or experiencing a recurrence of a certain disorder and complying with a medical regimen to decrease that risk (Dracup & Meleis, 1982; Kasl & Cobb, 1966). The main difference between the two roles involves the distinction between cure and prevention respectively.

The assumption is made that all individuals suffering from manic depression who are treated with, and respond to, lithium carbonate are representative of individuals in the at risk role. This assumption is supported by the use of lithium as a prophylactic medication for manic depression.

Considering the application of the at risk role to this hypothesis, the variables contributing to its analysis endeavour to measure the subject's probable internalisation of compliance within the role's expectations.

When extracting the variables to be analysed from the hypothesis, a problem arose with the variable of competency. Interpretation of 'competency' was difficult due to a lack of definition by Dracup and Meleis (1982). When it was subsequently defined to refer to a person's ability to enact a particular role, measurement by way of questionnaire seemed impracticable. As a variable it appears more suited to measurement by direct observation which was unrealistic for this study. For this reason competency has been omitted from the analysis of this hypothesis. The other variables extracted were:
1) level of personal acceptance of manic depression,
2) individual awareness of one's need to regularly take lithium, 3) level of knowledge about one's personal medication regimen, 4) complexity of medication regimen, and 5) duration of lithium medication regimen.

It was hypothesised that the interaction of the first three variables would influence one's compliance to lithium, which would be further affected by the level of complexity and duration of the person's medication regimen. As reviewed earlier complexity and duration of medication regimens were two out of less than ten identifiable variables studied which have shown some consistent relationship to compliance.

Hypothesis 2: "Compliance is maximised when there is evidence that the sick or at risk roles have been incorporated into the self-concept of the client" (Dracup & Meleis, 1982, p.34).

With the emphasis once again upon the at risk role the variables contributing to its analysis, as for hypothesis one, endeavour to measure the subject's probable internalisation of compliance within the role's expectations. The variables focus upon two main areas: 1) personal attitudes towards having manic depression, and 2) individual perceptions of susceptibility to manic depression. It is assumed that the interaction of both variables will provide some evidence of whether or not the at risk role has been incorporated into the self-concept.

The variable which considers perceptions of susceptibility to manic depression in the analysis of this hypothesis, is the same variable used in hypothesis one to investigate individual awareness of one's need to regularly take lithium. It has been repeated in this analysis because it is thought to represent a major characteristic of the at risk role. The importance of what may otherwise be termed 'insight', is supported by the findings of

del Campo, Carr & Correa (1983) and Van Putten, Crumpton and Yale (1976). These researchers found that lack of insight was a strong discriminating variable between compliers and noncompliers with the latter lacking insight.

Considering the focus upon the self-concept, it was also thought appropriate to administer a self-concept scale and the Multidimensional Health Locus of Control (MHLC) scale. Although not directly related to the outcome of the hypothesis' results, the two instruments would provide additional information as to whether or not any significant differences in either perception of real self or locus of control amongst individuals of the two groups, existed. Further analysis would investigate the relationship of each measurement to reported noncompliance.

Self-concept has been investigated very few times in relation to compliance and even then with inconsistent results. In 1976 Heinemann, Moore & Gurel investigated whether self-concept amongst a number of other variables might discriminate and therefore help predict those people likely to complete an alcoholism programme. Their findings reported no association. In addition in 1973, Brown & Brewster compared concepts of real and ideal selves amongst compliers and noncompliers. They found a negative association between the two.

The locus of control construct has shown in past research a small association with medication compliance, with internally oriented individuals generally showing the more compliant behaviour (Anderson, Reed & Kirk, 1982; B.S. Wallston & Wallston, 1978a). A major attraction for

using the MHLC scale in particular concerned its specific relevance to health related behaviours.

Hypothesis 3: "Compliance is enhanced when relevant other roles are congruent and/or complementary with client roles" (Dracup & Meleis, 1982, p.35).

The aim of hypothesis three is to determine whether or not subjects find themselves in roles which support a compliant stand within the at risk role. The roles chosen to study specifically have been broken down into four categories assumed to be evident in all of the subjects' lives. These include: 1) the doctor-patient relationship, 2) one's work, 3) one's family, and 4) one's living situation.

Each role will be studied independently to determine its influence upon each subject's level of compliance. A further analysis will examine the overall influence of all four roles together on compliance.

Doctor-Patient Relationship. As reviewed earlier, the doctor-patient relationship is considered an important variable in determining whether or not patients will be compliant. Although some inconsistency in findings has occurred, generally communication, including confidence expressed by doctor and attitude of doctor towards patient, has been found to be an especially important determinant.

The questions for analysis of the DPR in this hypothesis investigate the level of subject satisfaction with one's doctor. It is assumed that dissatisfaction with the level of communication, lack of approachability, lack of confidence and lack of support from one's doctor would indicate dissatisfaction with the relationship.

Other questions provide more factual information such as length of time subjects have been patients with their present doctor.

In addition to the analysis of data for the hypothesis two other aspects of the DPR are examined. Dietrich and Marton (1982) suggested that the effect of a continuous relationship with a personal health care provider improved compliance with medication. Using one year as a discriminating variable, a chi^2 analysis will compare the two groups.

Past research has also shown a trend for mutual doctor-patient relationships, (where the doctor discusses decisions etc. with the patient), to promote compliance. This is in contrast to more authoritarian type relationships on the doctor's behalf which have been found to be associated with noncompliance (Korsch, Gozzi & Francis, 1968; Korsch & Negrete, 1972, as noted by Jay et al, 1984).

Differentiating between authoritarian and mutual doctor-patient relationships a comparison between the two groups will be made using a chi^2 analysis.

Work. Despite many studies having investigated the effect of socioeconomic status upon compliance, no studies have investigated the effect of work upon compliance.

The variable 'work' for the purposes of this study encompasses a broad range of activities including both paid and voluntary jobs. Subjects were free to decide for themselves if they had a 'job', given the one condition that it incurred some regular commitment on their behalf. Reported examples ranged from paid jobs such as industrial

worker, postmaster, trainee manager and laboratory assistant, to voluntary jobs such as nurse aide, paper distributor and committee member.

The questions relating to the variable of 'work' attempt to determine what effect a regular commitment to a job might have on compliance. These questions in particular investigate: 1) whether or not one is 'working' and if so what it entails, 2) the importance of the job to those subjects working, and 3) the job's security if he or she needs to be rehospitalised. It is proposed that the more important a job is to a subject and the poorer the job's security in the case of rehospitalisation, the greater would be the likelihood of him or her being compliant. To analyse this proposition a group comparison will be made of the combined scores of the three questions. A correlational analysis will also be made of these combined scores to determine its relationship with noncompliance.

Finally the responses to each question related to 'work' will be individually compared between the groups.

Family. Past research indicates that the dynamics operating within the family may have some relationship with the level of compliance. Higher levels of medication compliance have been reported amongst patients with supportive families (Taylor, Sackett, Haynes & Johnson, 1978), and noncompliance associated with more negative family relationships (Barsky, 1983). Spouse support has also shown strong associations with whether or not patients adhere to medication (Doherty, Schrott, Metcalf & Iasiello-Vailas, 1983).

The questions contributing to this variable

investigate the degree of support subjects feel they receive from family members. Questions also examine the extent to which subjects feel an episode of mania or depression would be disruptive to their respective families. It was proposed that the more supportive the family, the greater the likelihood of compliance. In addition, since roles involve expectations and obligations from both parties, it was proposed that the more disruptive a subject perceives an episode of manic depression would be for his or her family, the greater would be the obligation on the subject's behalf to be compliant.

Living situation. Closely related to the aspect of family support are the conditions under which subjects live. For analysis of this variable, living situation has been scored in a similar way to the 'family' variable and attempts to ascertain satisfaction with present living situation.

If someone lives by himself or is getting little support from those whom he lives with, it is proposed he will be more likely to be noncompliant than if he lives with others and receives support from them to be compliant. This is often referred to as supervision, a lack of which is recognised as contributing to patient noncompliance (Blackwell, 1976; Cummings, Becker, Kirscht & Levin, 1982; Evans & Spelman, 1983; Seltzer, Roncari & Garfinkel, 1980).

Porter (1969) found that among general practice patients on chronic medication, social isolation (living alone) was a major contributing variable to noncompliance. This will be studied using a chi^2 analysis of group living situations.

Hypothesis 4: "Compliance is enhanced if the compliance role is reinforced by significant others and other reference groups" (Dracup & Meleis, 1982, p.35).

This hypothesis identifies two main variables to be studied: 1) the influence of significant others and 2) the influence of support groups; as they both contribute to the encouragement and reinforcement of subjects' compliance in the at risk role.

Considering the strong influence of people such as one's family and doctor upon compliance as already reviewed, it is reasonable to assume that other people significant in subjects' lives will also be influential. This proposal has been put forward for investigation.

Support groups have grown in popularity relatively recently. With no information previously reported about their relationship to compliance the opportunity now arises to study this interaction.

The questions contributing to each variable respectively investigate: 1) the role significant others play in reinforcing the at risk role as perceived indirectly by each subject, and 2) how helpful support groups are to members and what relationship they have to compliance.

Hypothesis 5: "The level and extent of a client's compliance with a health care regimen depends on the degree to which behaviours of compliance are judged valuable by the client and are validated by significant others" (Dracup & Meleis, 1982, p.35).

The two main variables derived from the above hypothesis for analysis represent: 1) perceived value of

compliant behaviour, and 2) validation of medication compliance by significant others.

Interpretation of this hypothesis was difficult because the authors had not defined 'behaviours of compliance'. For the purposes of analysis: favourable individual attitudes towards medication, favourable reports about its effectiveness in helping individuals cope with manic depression, and individual responses reaffirming the importance of taking medication as prescribed by their doctor, were categorised and analysed as behaviours of compliance.

With respect to the second variable, it is considered important that the validation by others be measured indirectly according to the subject's perception.

It is assumed that high cumulative scores obtained from questions contributing to each variable would be indicative of compliance while low scores would be indicative of noncompliance.

Each variable and the combined effect of both variables will be compared between the groups. These three variables will then be individually analysed to determine their independent relationships to reported noncompliance.

Hypothesis 6: "All four components of role enactment have to be present for compliance to occur" (Dracup & Meleis, 1982, p.35).

The four components which hypothesis six refers to are: 1) compliance role enactment, 2) incorporation of role into self concept, 3) counter roles, and 4) periodic evaluation of role.

These components are equivalent to those upon which the original hypotheses were formulated. This final hypothesis represents the bringing together of those hypotheses before it, and basically underlies the interactional model's theory of compliance.

Analysis will involve an examination of the results from the earlier hypotheses tested. This will be followed by an examination of a combination of variable scores between groups, and a correlational analysis of these combined scores with reported noncompliance.

CHAPTER 3

MATERIALS AND METHODS

3.1 SUBJECT SELECTION

Forty-five individuals from a local support group for manic depressives and sixty-six individuals recently discharged from a psychiatric hospital, with diagnoses of manic depression were individually approached by means of a letter written by the author (Appendix 1). The letter outlined that a study, investigating the effects of manic depression on people's lives was being undertaken. In particular, personal attitudes of individuals with manic depression towards the disorder, attitudes of others towards them,and various aspects of medication were being studied. Individual replies to the author's enclosed telephone number were encouraged. Those people who did not voluntarily respond to the letter were later personally contacted by the author and asked if they were interested in participating. If they were not, persuasion was not applied.

Once contact was made with potential subjects, questions referring to the object of the study were discussed. During the conversation reference was made to the layout of the questionnaire's three sections but no specific comments were made concerning the author's prime interest.

Initial plans were to have two evenly divided groups of 30 compliant and 30 noncompliant manic depressives.

Unfortunately difficulty was experienced locating 30 non-compliers. Because the level of compliance could not be ascertained until after administration of the questionnaire, time restrictions necessitated terminating interviews after 21 noncompliers and 43 compliers had been identified.

Subjects finally selected were required to meet three criteria:

1. To have had at least one hospitalisation caused by manic depression.

2. To have a current hospital diagnosis of manic depression.

3. To be undergoing current treatment with lithium carbonate.

The final sample of 64 subjects can be categorised in terms of age and sex as follows:

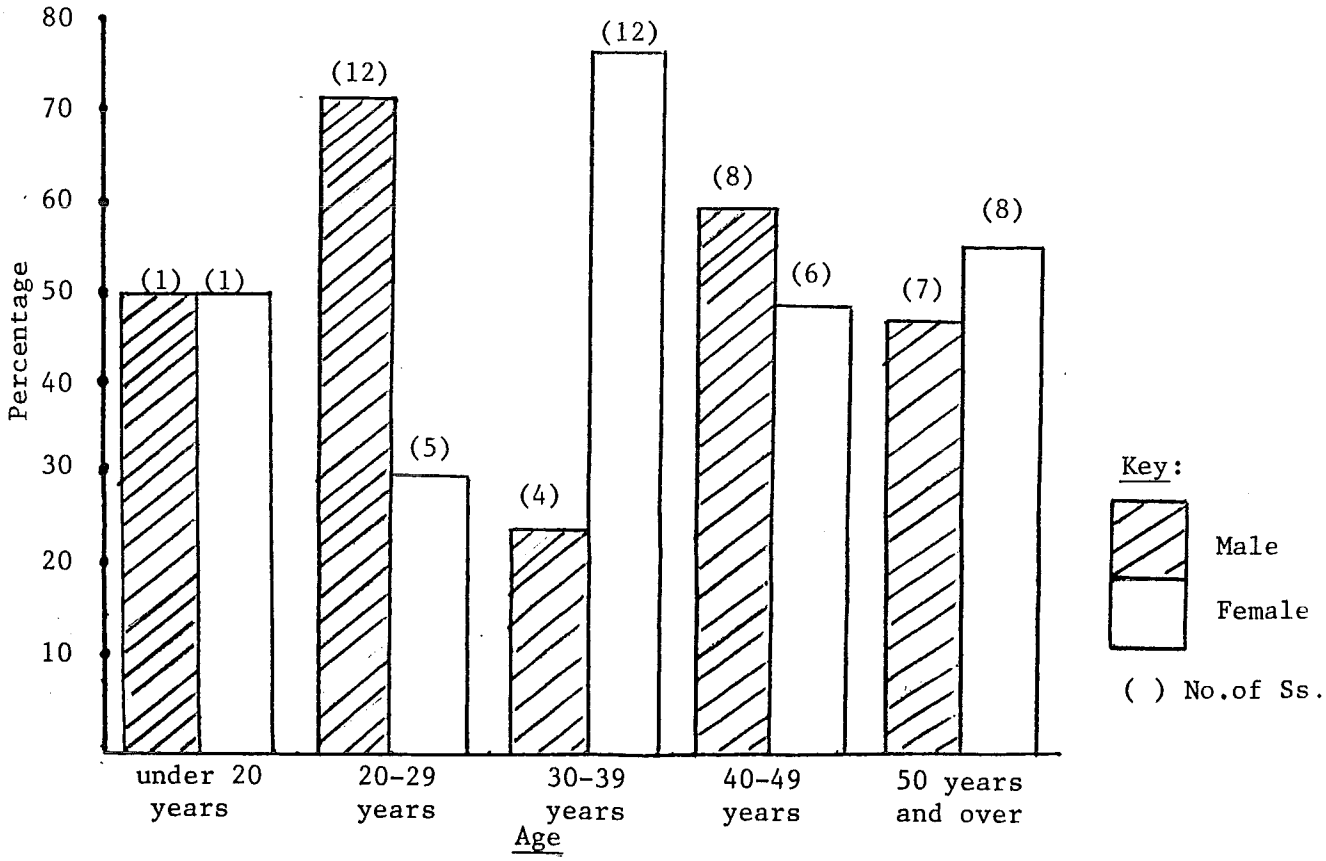


Fig. 2. Sample in terms of age and sex

3.2 SELECTION AND DEVELOPMENT OF RESEARCH INSTRUMENTS

All subjects completed three sections of a questionnaire composed of: 1) a measurement of self-concept, 2) a questionnaire designed to measure attitudes and medication compliance, 3) the Multidimensional Health Locus of Control Scale.

Before finalising the complete questionnaire format, it was piloted on four manic depressives presently being treated with lithium carbonate. This successfully identified questions in need of rewording and other small oversights.

3.2.1 Measurement of Self-Concept (see Appendix 2)

The semantic differential rating technique originally developed by Osgood, Suci & Tannenbaum (1957) was used to design an instrument to measure each subject's personal perception of their real self using the construct 'ME (AS I REALLY AM)'. Subjects rated themselves on this construct against 23 seven-point rating scales composed of bipolar adjectival opposites. Scale polarity was randomised to control for response set.

The semantic differential technique (S.D.T.) has been a popular method of measurement for self-referent constructs. More than 80 studies, up to 1974, had used it to measure such constructs (Wylie, 1974, p.224). Findings from other researchers since 1974 also support its use as a measure of self-concept (Drummond & McIntire, 1977, Piotrowski, 1983).

The self-referent construct 'ME' was used by Osgood et al (1957) in their first two factor analyses of scale correlations. These analyses yielded three main

orthogonal semantic response factors: evaluative (good-bad), potency (weak-strong) and activity (slow-fast), which have now become synonymous with the S.D.T. Osgood et al interpreted these factors as basic dimensions of connotative meaning or semantic space (Wylie, 1974). These three factors have continued to reveal themselves in the analyses of diverse studies using varied concepts and subjects.

Due to the prominence of the evaluative (E), potency (P), and activity (A) dimensions, scales associated with these three factors were chosen when constructing the present measurement of self-concept.

The semantic differential is a technique used for developing individual research instruments and not a specific test as such. Consequently there are no standard scales or constructs which must be used. When designing the instrument for this study, note was made of many past findings from research using the S.D.T. The scales were selected from what has come to be known as the 'Thesaurus study' (Osgood et al, 1957, pp.47-66). They were chosen for their representation of the three major factors and also for their appropriateness to the construct being studied.

Of the 23 scales chosen, 13 evaluative, 6 potency and 4 activity factorial scales were included. The unequal weighting of factorial scale numbers represented a selection of 50% of the scales documented under the three E.P. & A. factors. Within each factor the selection of scales represented those with the highest loadings on their respective factors. Five scales, (honest-dishonest; free-inhibited; unfriendly-friendly; brave-cowardly; selfish-unselfish) were not the actual ones tested in the original study but

were acknowledged by Osgood et al (1957) as being related to those in the analysis.

Objectivity: The method of data collection is essentially objective and reproducible, with any subjectivity being restricted to analysis of the results.

Reliability: Test-retest reliability coefficients from a variety of studies using the S.D.T. have been high. Osgood et al (1957, p.126-7) reported a coefficient of 0.85, Jenkins, Russell & Suci (1958) reported a coefficient of 0.97, and more recently Piotrowski (1983) reported low but significant test-retest correlations on all scales tested. Unfortunately these scores were not reported.

Several studies reported by Osgood et al (1957, pp.129-132) also reported a small error of measurement of less than one scale unit, indicative of high reliability. The statistical significance of such a small error of measurement was recorded at the 0.05 level.

Validity: Osgood et al (1957) consider there is little question about the general face validity of the S.D.T. finding that it clusters concepts in much the same way as people do.

The three factors E.P. & A. have been validated (Heise, 1969) and cross cultural studies have consistently found the same semantic structure across different languages (Jakobovits, 1966, Kumata & Schramm, 1969). This work also substantiates the comparability of the S.D.T. across subjects. Note is made of the low level of comparability across concepts. However, considering one of the functions of the S.D.T. is to differentiate individual meanings of constructs, this comment does not appear valid. Scoring of this instrument is outlined in Appendix 3.

3.2.2 Measurement of Attitudes and Medication Compliance (see Appendix 4)

This questionnaire was constructed with the principal goal of collecting data for analysis of the proposed hypotheses. Each hypothesis was individually analysed and appropriate questions relating to each one were written generating over 150 questions. These were systematically reviewed until the minimum number thought necessary for analysis of each hypothesis, and additional compliance and personal information, remained. This resulted in 66 items with approximately 50% factual and 50% additudinal.

Table 1 provides a breakdown of which questions provide information for which variables. These variables are subsequently associated with specific hypotheses and additional areas of interest. Hypotheis 6 is not included on this breakdown of the questionnaire as this hypothesis simply involved an analysis of the previous hypotheses.

Some questions provided information for more than one hypothesis enabling some economising on questions. Question 57 for example provided information about the subject's attitude towards the use of medication, applicable to hypothesis 2, while also providing information applicable to hypothesis 5.

Included amongst these 66 questions was a five question self-report lithium compliance questionnaire developed and used by K. Kucera-Bozarth (personal communication 20 April, 1984), (see Appendix 6). The original questions were modified slightly and are included in questions 18, 59, 60, 61 and 62.

Table 1 Breakdown of attitudinal questionnaire into questions, variables and hypotheses

Questions	Variables
Hypothesis 1	
12 & 13	Recognition of personal risk involved in being noncompliant.
23	Personal acceptance of manic depression.
Hypothesis 2	
12 & 13	Personal recognition of susceptibility to manic depression.
14,15 & 16	Knowledge and complexity of personal medication regimen.
17	Duration of medication regimen.
19-23 inclusive, 57, 58 & 62	Personal attitudes to manic depression and medication.
Hypothesis 3	
5,6 & 37	Work
24-36 inclusive	Doctor-patient relationship
38-43 inclusive	Living situation
44,45 & 46	Family
Hypothesis 4	
47-51 inclusive	Support Groups
52-56 inclusive	Significant others
Hypothesis 5	
56	Value of compliant behaviour to significant others as perceived by subject.
57,58 & 62	Perceived value of medication and compliant behaviour to subject.
Additional Areas	
1-5 inclusive) 7-11 inclusive)	Sociodemographic and personal questions
18,59,60, 61,62	Compliance Measurement
64,65 & 66	Patterns of noncompliance

The inclusion of a self-report measurement of compliance was considered adequate and appropriate for this study. Reflecting upon the methods used for measuring medication compliance reviewed earlier, all methods are recognised as having some inadequacies. With respect to lithium measurement, what is generally regarded as the most objective method, i.e. serum lithium testing, is still subject to a major limitation. If unusually large quantities of lithium are consumed prior to a scheduled serum lithium test an extremely noncompliant person will appear faithfully compliant, (Schwarcz, 1980). Considering the limitations of the various methods of measurement and the resources available, it was decided to restrict compliance measurements to self-report. Nevertheless a check was made of the reliability of the self-report measures, against a number of blood tests. The results of serum lithium tests undertaken by 17 subjects within 2 weeks prior to the author's interview with them were compared with their reported levels of compliance for those 2 weeks.

Nineteen per cent (N=4) of the noncompliers and 30.2% (N=13) of the compliers had had blood tests within two weeks prior to the interview (Table 2).

The blood test levels for each of these noncompliers was less than their average lithium level (taken as the average of their last five blood serum lithium levels). In comparison only five of the thirteen compliers had lithium levels less than their average reading. A noticeable difference equivalent to 0.10 mmole/l differentiates the noncompliers last lithium levels with their average recorded lithium levels. In comparison a difference of only 0.01 mmole/l differentiates the compliers' last lithium levels with their average

recorded lithium levels (Table 2). Although not statistically significant the results do show some face validity when compared with the reported levels of noncompliance for each group.

Table 2 Figures relating to subjects having had blood tests within two weeks prior to interview

Group	% of Group	N	Ave.of Last Lithium Level	Ave. Lithium Level	Last Lithium Level Min	Last Lithium Level Max	% of Self reported Noncompliance Level Ave	% of Self reported Noncompliance Level Min	% of Self reported Noncompliance Level Max
Non-compliant	19	4	0.46	0.56	0.28	0.64	27.9	11.9	64.3
Compliant	30.2	13	0.57	0.58	0.46	0.78	0.5	0.0	4.7

The most direct questions of compliance were asked towards the end of Section B as part of the questionnaire interview. Honesty in responding to questions was encouraged by promoting a relaxed interview, a nonjudgemental attitude towards subjects' replies, and developing rapport during the interview. For the scoring procedure see Appendix 5.

3.2.3 Muldimensional Health Locus of Control (MHLC) Scale*

The MHLC scale reflects the extent to which individuals perceive their health to be dependent upon their own behaviour (internal health locus of control); chance, fate or luck (chance health locus of control); and powerful others (powerful others health locus of control). It consists of 18 statements with six responses ranging from 'strongly disagree' to 'strongly agree' yielding scores on three theoretically and empirically differentiated scales. Two equivalent forms of the scale are available. They were validated by O'Looney

* See Appendix 7.

& Barrett (1983) who reported a factor validity coefficient greater than 0.90 when correlated with one another. Form A was selected for use in the present study.

The MHLC scale was chosen because of its reported superiority in understanding specific health-related behaviours. Past evidence indicates that the locus of control construct is relevant to the prediction of health behaviours including medication compliance (B.S. Wallston & Wallston, 1978). Internally oriented individuals have generally shown the more positive behaviours but contradictory evidence has also been reported.

The MHLC scale extended from the work of other locus of control researchers, such as Levenson (1973a&b, 1974) and Rotter (1966), also expanding upon the original health locus of control scale developed by B.S. Wallston, Wallston, Kaplan & Maides (1976).

Reliability: Alpha reliabilities range from 0.673 to 0.767 (K.A. Wallston, Wallston & De Vellis, 1978).

Validity: Health status was correlated with MHLC scores, correlating positively and significantly with internal health locus of control ($r = .403$, $p < .001$), negatively with chance health locus of control ($r = -.275$, $p < .01$), and not at all with powerful others health locus of control ($r = .055$). It is acknowledged however that as a relatively modern instrument more research is required to more accurately determine the reliability and validity of the instrument (K.A. Wallston et al 1978). For the scoring procedure see Appendix 8.

3.3 PROCEDURE

The Chairman of the Canterbury Hospital Board's

Ethical Committee gave the committee's approval for the study to proceed after a detailed proposal was submitted to the committee in 1983. Changes made in 1984 were also approved by the committee.

Data were collected during one interview with each subject which lasted on average two to three hours. Interviews extended over a three month period from August to October 1984 inclusive. Each interview was conducted by the author.

Except for administration of the actual questionnaire each interview was largely informal, being conducted at each individual's home or flat.

Before administration of the questionnaire, the author outlined the various aspects of the study as detailed on the front page of the questionnaire. It was explained to each subject that the information collected was required for personal university research and would be completely confidential. Contact with individual doctors would be necessary in order to confirm some of the information gathered, but no information would be passed on to their doctor.

At this stage consent forms were signed by the subject agreeing to participate in the study. This also gave permission for the author to seek the necessary information from their doctor.

Following this the subject and author worked through the instructions and the first scale of Section A together. This helped make sure the subject understood what was required of him in responding to the scales. The subject then worked through the rest of Section A by himself. This

technique was used in preference to the subject and author working through it together as the task was thought to be an especially personal one. It was thought it would yield more honest responses and be less embarrassing to each subject if he was left to do it himself.

A structured questionnaire interview followed with both the subject and author working through the two remaining sections, B and C, together. The author wrote the subject's responses down on the subject's original questionnaire which he had just completed Section A on. Meanwhile the subject followed the questions being asked from a spare copy of the questionnaire. A break of 10-15 minutes was taken after question 36 in Section B.

This interview technique was considered the most appropriate for the final two sections for a vareity of reasons. It provided a relaxed setting with neither individual feeling tense as sometimes happens when subjects are left to fill in a questionnaire, knowing someone is waiting for them to finish. It ensured that each subject was responding to a similar presentation of questions. It enabled the author to probe for more information where necessary and rephrase any questions not understood. It ensured no questions were missed out and total completion of all questionnaires. It was also found to save time.

If tension was sensed by the author during any stage of the visit an effort was made to ease the situation.

After completion of the subject interviews, subjects were assigned to one of two groups according to their level of self reported compliance. Gordis (1979) outlines a variety of methods used by researchers to categorise subjects into

compliant or noncompliant groups. The more commonly used method is to select an arbitrary level of noncompliance above which people are categorised as noncompliant and below which people are compliant. With no standard cutoff point regularly used in the literature on medication compliance an arbitrary level of 10% was chosen for this study. Group 1 (N = 21) consisted of subjects who reported 10% or greater non-compliance over the previous two weeks, while Group 2 (N = 43) consisted of subjects with less than 10% reported non-compliance. A cutoff point of 10% was chosen since in practical terms this represented at least the equivalent of 1½ days total lithium noncompliance over the previous two weeks. This also allowed for 14 subjects who reported missing the odd one or two lithium accidentally to be still categorised as compliant. Considering the average level of reported noncompliance amongst the noncompliant group was 51.4% as against 1.2% amongst the compliers,there is a very large difference in the level of lithium noncompliance each group represents.

The distribution of self-reported rates of noncompliance amongst the subjects is represented in Table 3.

Following the termination of subject interviews, personal interviews with 22 doctors were arranged. These were conducted by the author during November. During these interviews confirmation was made of each subject's last admission and discharge dates to hospital, medication prescriptions, date of last blood serum lithium test and most recent hospital diagnosis. Note was also made of each subject's last five blood serum lithium levels. Information collected during these interviews was cross checked with

the subjects' individual responses and note of any corrections was made where necessary.

Table 3 Distribution of Rates of Noncompliance over Two Weeks prior to Interview Amongst Compliers and Noncompliers

Group	N	Min. Level%	Max. Level%	Mean Level%
Compliers	43	0.0	7.1	1.2
Level of Reported Noncompliance %				
0.0	29			
2.3	5			
2.8	2			
3.6	2			
4.0	1			
4.7	2			
7.1	2			
Noncompliers	21	10.7	100.0	51.4
Level of Reported Noncompliance %				
10.7	2			
11.9	2			
14.2	1			
14.3	2			
21.4	2			
33.3	1			
35.7	1			
55.0	1			
64.3	1			
71.4	1			
89.3	1			
100.0	6			

CHAPTER 4

RESULTS

4.1 ANALYSIS OF DATA

The variables which form the major part of the analysis for each hypothesis are composed of responses to appropriate questions in the questionnaire. Although one or two variables rely on scores from only one question, the majority of variables represent the cumulative score of a number of questions. Scoring was designed so that the higher the positive score, the greater was the likelihood of medication compliance. Similarly the lower the score the greater was the likelihood of noncompliance.

With the exception of some 'descriptive' questions which used discrete data, all other questions used continuous data, which allowed for the testing of mean scores between groups and correlational testing with reported noncompliance.

All comparisons between groups were analysed using the two-tailed t-test for means of independent samples. Data analysed with the t-test were required to be continuous, normally distributed within the two groups, with roughly equal standard deviations. When data were affected by either small groups or uneven distributions, a Mann Whitney U test was used also and both results are reported. In some cases a t-test was obviously inapplicable and a Mann Whitney U test has been applied by itself.

When the Mann Whitney U test was used, the size of the sample enabled the U statistic to be transformed into a normally distributed statistic, z, which is corrected for ties. This is presented with its two-tailed probability confidence level (Hull & Nie, 1981, p.232).

In the majority of compliance studies to date emphasis has been placed upon comparing arbitrarily defined compliant and noncompliant groups. This isolated method of analysis is questioned because of the unstandardised technique used to distinguish the groups. Consequently all data which would normally be analysed using only t-tests and Mann Whitney U tests have also been correlated with reported noncompliance to determine the nature of their relationship.

Discrete data were analysed using the chi^2 test to determine whether or not significant differences existed between the two groups on a variable. Unfortunately the nature of this data only allowed for group comparisons to be made.

All statistical analyses used the SPSS package (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975).

4.2 HYPOTHESIS 1

The first analysis was of the first three variables, 1) level of personal acceptance of manic depression, 2) individual awareness of one's need to regularly take lithium, and 3) level of knowledge about one's personal medication regimen (Table 25). A t-test and Mann Whitney U test were used. Results from both tests just failed to show a statistically significant difference between the groups ($t = 1.95$, $p = .06$; $z = 1.89$, $p = .06$).

The first analysis was repeated with additional scores from the fourth and fifth variables: complexity and duration of medication regimens, respectively (Table 25). These results showed no significant difference between the groups ($t = 0.79$, $p = .43$; $z = 0.70$, $p = .48$).

The five independent variables and two combinations which contributed to the above analyses were individually analysed using Pearson's correlation to determine their relationship with reported noncompliance (Table 4).

Table 4 Pearson's Correlation Coefficients of Hypothesis 1 Variables with Noncompliance

	N	A	B	C	D	E	F	G
Pearson's Correlation	64	-.11	-.31	-.20	-.27	.13	.03	-.15
Probability	64	.20	p<.01	.06	.01	.16	.40	.13

Key:
A Personal acceptance of manic depression
B Awareness of personal need to take lithium
C Knowledge about personal medication regimen
D Combination of variables A, B & C
E Complexity of personal medication regimen
F Duration of personal medication regimen
G Complete role enactment - combination of variables A, B, C, E & F.

Only one of the first three variables tested, awareness of personal need to take lithium regularly, had a statistically significant negative correlation with level of reported noncompliance. This finding supports the hypothesis, although results from the other two variables: personal acceptance of manic depression, and knowledge about

personal medical regimen which reported no specific association do not support the hypothesis. Nevertheless, when these three variables in combination were correlated with reported noncompliance a statistically significant negative relationship was found. This finding does support the hypothesis.

Neither the complexity nor the duration of one's medication regimen, nor the combined effect of all the variables, showed statistically significant relationships with noncompliance. These final results do not support the hypothesis.

4.3 HYPOTHESIS 2

The t-test and Mann Whitney U test analysed for differences between groups in personal attitudes towards having manic depression (Table 25). Results were statistically significant in both cases ($t = 2.70$, $p<.01$; $z = 2.16$, $p = .03$). A second analysis used the t-test upon individual perceptions of susceptibility to manic depression (Table 25). Results were not statistically significant ($t = 1.85$, $p = .07$).

A Mann Whitney U test analysed the combined effect of both variables: 1) personal attitudes towards having manic depression, and 2) individual perceptions of susceptibility to manic depression. Results showed a statistically significant difference between groups ($z = 2.19$, $p = .03$).

Individual correlational analyses of both variables and their combined effect found statistically significant negative relationships between each variable and reported

level of noncompliance (Table 5).

Table 5 Pearson's Correlation Coefficients of Hypothesis 2 Variables with Noncompliance

	N	A	B	C
Pearson's Correlation	64	-.44	-.31	-.47
Probability	64	p<.001	p<.01	p<.001

Key:

A Personal attitudes towards having manic depression

B Individual perceptions of susceptibility to manic depression

C Combined effect of A and B

Based on the assumption that positive attitudes to having manic depression and realistic individual perceptions of susceptibility to manic depression are indicative of incorporation of the at risk role into one's self-concept, the results of both the between group and correlational analyses support hypothesis 2.

With respect to the results of the measurement of self-concept, an analysis was performed on the scores obtained by each group on the predetermined Evaluative, Potency and Activity factors. The t-test and Mann Whitney U tests were used (Table 25). No significant results were found.

(E $t = 0.68$, $p = 50$; $z = 0.52$, $p = .60$

P $t = 1.64$, $p = 10$; $z = 1.48$, $p = .13$

A $t = 1.56$, $p = .12$; $z = 1.50$, $p = .13$)

The scores representative of each factor were also individually correlated with reported noncompliance

(Table 6). While the evaluative factor was not significant both the potency and activity factors showed statistically significant positive correlations with reported non-compliance.

Table 6 Pearson's Correlation Coefficients of Factors Underlying the Measurement of Self-Concept with Noncompliance

Variable	N	E	P	A
Pearson's Correlation	64	.03	.20	.24
Probability	64	.41	.05	.03

A variety of factor analyses were performed on the scales to determine whether the Evaluative, Potency and Activity factors were dominant within the self-concept scale used. Although the scales used were initially chosen because of their high factorial loadings, the results failed to replicate past factorial analyses.

When analysing the results of the MHLC scale, both the t-test and Mann Whitney U tests were used.

The independent scores representative of the internal, powerful other and chance health locus of control scores were ascertained for each subject. The average group score of each locus of control was compared between the two groups (Table 25). The results were not statistically significant.

(IHLC $t = 0.41$, $p = .68$; $z = 0.32$, $p = .75$

POHLC $t = 1.73$, $p = .08$; $z = 1.61$, $p = .10$

CHLC $t = 0.11$, $p = .90$; $z = 0.04$, $p = .96$)

A chi^2 analysis performed between the two groups to determine if a greater percentage of either group had a more dominant locus of control (Table 7) was also not significant (χ^2 (df = 3, n = 64) = 1.34, p = .72).

Table 7 Distribution of Specific Loci of Control per Group

Groups	Health Locus of Control 0	1	2	3	Row Total %
Noncompliant	1	11	4	5	21 32.8
Compliant	4	20	12	7	43 67.2
Column	5	31	16	12	64
Total %	7.8	48.4	25.0	18.8	100.0

Key:

0 Individuals without one dominant health locus of control

1 Internal Health Locus of Control

2 Powerful Other Health Locus of Control

3 Chance Health Locus of Control

The scores representative of each health locus of control were also independently correlated with reported noncompliance (Table 8). The IHLC showed a statistically significant positive relationship with reported noncompliance although neither the POHLC nor the CHLC showed statistically significant results.

Table 8 Pearson's Correlation Coefficients of Health Loci of Control Scores with Noncompliance

Variables	N	IHLC	POHLC	CHLC
Pearson's Correlation	64	.27	-.17	-.18
Probability	64	.02	.08	.07

4.4 HYPOTHESIS 3

The analysis of data for hypothesis three was divided into five stages:

1. Doctor-patient relationship
2. Work
3. Family
4. Living situation
5. Interaction of the four roles upon noncompliance.

1. Doctor-patient relationship

A Mann Whitney U test analysed subject satisfaction with the doctor-patient relationship to test for group differences (Table 25). Results were not significant ($z = 1.41$, $p = .16$).

A correlational analysis of the doctor-patient relationship with reported noncompliance (Table 24) was not significant ($r = -.18$, $p = .08$) Neither of these findings support the hypothesis.

A chi^2 analysis compared the compliant and non-compliant groups to determine if any difference existed with respect to length of time subjects had been patients with their present doctors (Table 9). Using one year as the discriminating variable results were not significant

(χ^2 (df = 1, N = 64) = 0.12, p = .73).

Table 9 Time as Patient with Present Doctor

Groups	Time as Patient 1	2	Row Total %
Noncompliant	7	14	21 32.8
Compliant	11	32	43 67.2
Column	18	46	64
Total %	28.1	71.9	100.0

Key:

1 Less than 1 year

2 Over 1 year

A second chi^2 analysis tested whether or not type of relationship with doctor, i.e. authoritarian vs mutual, differentiated compliers and noncompliers (Table 10). No significant results were found (χ^2 (df = 1, N = 64) = 1.71, p = .19).

Table 10 Type of Doctor-Patient Relationship Per Group

Groups	D.P.R. 1	2	Row Total %
Noncompliant	5	16	21 32.8
Compliant	19	24	43 67.2
Column	24	40	64
Total %	37.5	62.5	100.0

Key:

1 Authoritarian relationship on behalf of doctor

2 Mutual relationship between doctor and patient

2. Work

The assumption was made that a person with poor job security, who thought highly of his job would have more incentive to comply with his medication than someone who: a) wasn't working, or b) had a job with good security that wasn't especially important to him. Based on this assumption group scores were compared using a t-test (Table 25). Results were not significant ($t = 0.38$, $p = .70$).

A correlational analysis of work and reported non-compliance (Table 24) did not show any statistically significant results ($r = .02$, $p = .43$). Neither of these findings support the hypothesis.

A chi^2 analysis investigated whether or not any differences existed between groups with respect to work engaged in (Table 11). No significant differences were found (χ^2 ($df = 2$, $N = 64$) $= 0.69$, $p = .70$).

Table 11 Type of Work Engaged In

Groups	Work 0	1	2	Row Total %
Noncompliant	13	2	6	21 32.8
Compliant	22	6	15	43 67.2
Column	35	8	21	64
Total %	54.7	12.5	32.8	100.0

Key:

0 Not working

1 Voluntary work

2 Paid work

A second analysis using chi^2 examined whether or not work was more important to compliers than noncompliers amongst subjects working (Table 12). No significant differences were found (χ^2 (df = 3, N = 29) = 0.22, p = .97).

Table 12 Importance of Work to Subjects Working

Groups	Importance of Work 0	1	2	3	Row Total %
Noncompliant	1	1	3	3	8 27.6
Compliant	3	3	9	6	21 72.4
Column	4	4	12	9	29
Total %	13.8	13.8	41.4	31.0	100.0

Key:

0 Not important

1 Slightly important

2 Moderately important

3 Very important

A third analysis used chi^2 to examine between groups job security amongst working subjects if they were rehospitalised (Table 13). The results were not significant (χ^2 (df = 1, N = 29) = 0.125, p = .72).

Table 13 Job Security Amongst Workers

Groups	Job Security 1	2	Row Total %
Noncompliant	6	2	8 27.6
Compliant	17	4	21 72.4
Column Total %	23 79.3	6 20.7	29 100.0

Key: 1 Job would be kept open 2 Job would be lost

3. Family

The analysis used a t-test to examine whether or not any significant differences existed between groups with respect to support from and obligations towards family (Table 25). No significant results were found ($t = 0.66$, $p = .51$).

A correlational analysis of family and reported noncompliance (Table 24) was not significant ($r = -.05$, $p = .36$). Neither of these findings support the hypothesis.

4. Living Situation

A t-test investigated level of satisfaction with living situation between groups (Table 25). Results showed no statistically significant differences ($t = 1.68$, $p = .09$).

A correlational analysis of subjects' satisfaction with living situation and reported noncompliance (Table 24) found a statistically significant negative relationship ($r = -.34$, $p<.01$). Although the group comparison does not support the hypothesis, the correlational analysis does.

Using a chi^2 analysis to compare type of living situation between groups (Table 14), no significant differences were found (χ^2 (df = 2, N = 64) = 5.45, $p = .07$).

Table 14 Subjects' Living Situation

	Living Situation 1	2	3	Row Total %
Noncompliant	7	7	7	21 32.8
Compliant	10	27	6	43 67.2
Column	17	34	13	64
Total %	26.6	53.1	20.3	100.0

Key: 1 Live alone
2 Live with family
3 Live with others, not family

5. Interaction of the four roles upon noncompliance

A Mann Whitney U test investigated the combined effect of all four variables: doctor-patient relationship, work, family and living situation upon compliance (Table 25). Results were not statistically significant ($z = 1.86$, $p = .06$).

Correlations were also performed on each of the five variables to determine their individual relationship and combined relationship with noncompliance (Table 15).

Table 15 Pearson's Correlation Coefficients of Hypothesis 3 Variables with Noncompliance

Variables	N	A	B	C	D	E
Pearson's Correlation	64	-.18	.02	-.05	-.34	-.24
Probability	64	.07	.43	.36	p<.01	.03

Key:

A Doctor-patient relationship
B Work
C Family
D Living Situation
E Combined Effect of all variables

Two variables showed a statistically significant negative relationship with noncompliance. These were: 1) satisfaction with living situation, and 2) the combined effect of all variables. Each of these variables had confidence levels less than .05.

The statistically significant negative relationship that the combined effect of all variables has upon non-compliance supports the hypothesis.

4.5 HYPOTHESIS 4

The Mann Whitney U test was used to compare the influence significant others had in reinforcing the at risk role, between groups. The results were not significant ($z = 1.52$, $p = .13$). (Table 25, p.87)

A correlational analysis of the influence of significant others and reported noncompliance (Table 24) just failed to reach statistical significance ($r = -.20$, $p = .06$). These findings do not support the hypothesis.

A chi^2 analysis was used to compare the number of subjects who belonged to a support group (Table 16).

Table 16 Support Group Membership Amongst Subjects

Groups	Group Membership 1	2	Row Total %
Noncompliant	19	2	21 32.8
Compliant	20	23	43 67.2
Column	39	25	64
Total %	60.9	39.1	100.0

Key:

1 Subjects who don't belong to a support group

2 Subjects who do belong to a support group

Results were statistically significant (χ^2 (df = 1, N = 64) = 9.68, $p<.001$).

A correlational analysis of perceived helpfulness of support groups with noncompliance used information supplied by the 25 subjects who belonged to a group (Table 24). Results showed a statistically significant negative relationship ($r = -.57$, $p<.001$).

Additional analysis showed that the two noncompliant subjects who belonged to a support group, did not find it helpful. In comparison, only one of the 25 compliant subjects who belonged to a group found it not helpful. All the other subjects considered it either slightly, moderately or extremely helpful, evenly divided in each category.

Although the majority of subjects belonging to a support group belonged to the local Manic Depressive Society's support group (76%), some subjects belonged to other groups. These included Alcoholics Anonymous (8% N=2), church groups (8%), a hospital psychotherapy group (4%) and a community support group for individuals with psychiatric and psychological problems (4%). Individuals found these other groups helpful to them in coping with their manic depression.

The Mann Whitney U test examined the interaction of significant others and participation in a support group. It proposed that reinforcement from significant others and reinforcement from a support group would encourage high compliance (Table 25). The results were not statistically significant ($z = 1.826$, $p = .07$).

A correlational analysis of the combined effect of reinforcement from significant others and participation in a support group with reported noncompliance (Table 17) found a statistically significant negative relationship ($r = -.21$, $p = .04$). While the group comparison does not support the hypothesis the correlational analysis does support it.

Table 17 Pearson's Correlation Coefficients of Hypothesis 4 Variables with Noncompliance

Variables	A	B	C
N	64	25	64
Pearson's Correlation	-.20	-.57	-.21
Probability	.06	p<.001	.04

Key:

A Influence of significant others

B Helpfulness of support group

C Support group participation and influence of significant others

Two variables showed statistically significant negative correlations with noncompliance. These were: 1) helpfulness of support group (as ascertained by the 25 subjects belonging to a group) and, 2) the combined effect of participation/nonparticipation in a group with the additional influence of significant others. Although these results support the hypothesis care has to be taken interpreting them.

4.6 HYPOTHESIS 5

A t-test and Mann Whitney U test were used to test for differences between groups according to the perceived value of compliance behaviours (Table 25). Findings were significant in both tests ($t = 5.42$, $p<.001$) , ($z = 4.36$, $p<.001$). These findings support the hypothesis. A second analysis used the t-test and Mann Whitney U test to test for differences in the validation of medication compliance

by significant others (Table 25). Findings were not statistically significant ($t = 1.85$, $p = .07$) ($z = 1.743$, $p = .08$).

A further analysis using the t-test and Mann Whitney U test investigated the combined effect of both variables (Table 25). The results indicated a statistically significant difference between the two groups in the scores obtained ($t = 3.48$, $p<.001$) ($z = 3.27$, $p<.001$).

Pearson's correlation coefficients were also used to determine the individual relationship of each variable to reported noncompliance (Table 18). All variables showed statistically significant negative relationships to non-compliance. These results support the hypothesis.

Table 18 Pearson's Correlation Coefficients of Hypothesis 5 Variables with Noncompliance

Variables	N	A	B	C
Pearson's Correlation	64	-.61	-.32	-.50
Probability	64	p<.001	p<.01	p<.001

Key:

A Perceived value of compliant behaviour

B Validation of medication compliance by significant others

C Combined effect of A and B.

4.7 HYPOTHESIS 6

The analysis of hypothesis six involved the testing of scores accumulated from the previous analysis of each hypothesis (Table 24). The accumulated scores represented continuous data which enabled a comparison of mean scores between the groups. The analysis considered the combined effect of the following variables upon compliance: 1) knowledge in enacting the at risk role, 2) complexity and duration of medical regimen, 3) incorporation of 'at risk' role into the self-concept, 4) presence of congruent role expectations as demanded by other roles, 5) influence of significant others and participation in a support group, 6) perceived value of compliant behaviour and 7) validation of medication compliance by significant others.

A t-test compared the mean cumulative scores of each group (Table 25). Results showed a statistically significant difference between groups ($t = 3.25$, $p = .002$).

The combined effect of all the variables was correlated with reported noncompliance to ascertain the relationship between the two variables. Results were statistically significant ($r = -.44$, $N = 64$, $p<.001$).

SOCIODEMOGRAPHIC VARIABLES

An additional analysis was also made of general sociodemographic variables included in the questionnaire. These variables were: marital status, sex, age, family history of manic depression, and length of time the manic depressive diagnosis had been known by the subject.

Table 19 Group Comparisons of Sociodemographic Variables (N = 64)

Variable	χ^2	df	p.
Marital Status	8.15	2	0.02
Sex	0.00	1	1.00
Age	12.89	4	0.01
Education	5.23	5	0.38
Family History	0.35	1	0.55
Time	2.76	3	0.43

A chi^2 analysis found that both marital status (Table 20) and age (Table 21) showed statistically significant differences between groups (Table 19).

Table 20 Marital Status of Subjects (N = 64)

Groups	Status Single	Married	Div, Sep, Widowed	Row Total %
Noncompliant	14	3	4	21 32.8
Compliant	13	18	12	43 67.2
Column	27	21	16	64
Total %	42.2	32.8	25.0	100.0

Table 21 Age of Subjects (N = 64)

Groups	Age					Row Total %
	Under 20 yrs.	20-29 yrs	30-39 yrs	40-49 yrs	50-Yrs & over	
Noncompliant	1	11	5	2	2	21 32.8
Compliant	1	6	11	12	13	43 67.2
Column	2	17	16	14	15	64
Total %	3.1	26.6	25.0	21.9	23.4	100.0

COMPLIANCE VARIABLES

An analysis was made of the other four modified questions from Kucera-Bozarth's self-report compliance questionnaire (Appendix 6). These questions investigated: 1) the likelihood of being noncompliant and reasons for it, 2) time of day medication had been taken, 3) number of lithium taken daily, and 4) importance to each subject of taking medication as directed by his or her doctor.

Using a chi^2 analysis to compare groups the results showed that all these questions as presented in their modified form showed statistically significant differences between groups. The results were in the expected direction for each group. The probability level for each question was less than .001.

Other questions analysed under the heading of compliance-oriented variables were: 1) how long ago each subject had had his or her last blood test considering the necessity for patients on lithium to have blood tests

approximately every three months, 2) whether or not subjects had been noncompliant before, and if so, for how long, 3) amongst subjects who had been noncompliant before, how long ago had this happened, 4) were subjects aware of any specific consequences from having done this. Each aspect of compliance is analysed accordingly.

Using chi^2 for the analysis and three months as a discriminative variable, no significant differences were found between groups according to last time subjects had their serum lithium levels tested (χ^2 (df = 1, N = 64) = 0.076, p = .78).

Questions asking whether or not subjects had been noncompliant before, and if so, for how long were open-ended. During coding four categories were created: 1) once for less than a week, 2) once for over a week, 3) more than once, for longer than a week each time, and 4) not applicable. Analysing these categories between the groups (Table 22) using a chi^2 analysis, a statistically significant difference was found (χ^2 (df = 3, N = 64) = 16.5, $p<0.01$).

Table 22 Periods of previous noncompliance

	Previous noncompliance 1	2	3	4	Row Total %
Noncompliant	2	1	14	4	21 32.8
Compliant	4	3	8	28	43 67.2
Column	6	4	22	32	60
Total %	9.4	6.3	34.4	50.0	100.0

Key:

1 Once, for less than 1 week
2 Once, for longer than 1 week
3 More than once, for longer than 1 week each time
4 N/A.

Information from the 32 subjects of both groups who had been noncompliant before was tested to determine how long ago this happened. The three categories which resulted from the responses given to the open-ended questions were: 1) over one year ago, 2) within the last year, and 3) prior to and during this year. A chi^2 analysis tested for differences between groups amongst these categories but results were not significant (χ^2 (df = 2, N = 32) = 5.6, $p<.10$).

Finally, an analysis between groups (Table 23) amongst the 32 subjects who had been noncompliant before showed a statistically significant difference in awareness of consequences from having done this (χ^2 (df = 1, N = 32) = 7.07, $p<.05$).

Table 23 Consequences of past noncompliance

	1	2	Row Total %
Noncompliant	8	9	17 53.1
Compliant	2	13	15 46.9
Column	10	22	32
Total %	31.2	68.8	100.0

Key:

1 No awareness of consequences

2 Aware of bad consequences

Table 24 Summary of Correlations of Variables with Noncompliance (N = 64)

Variable	Pearson's Correlation	p< Probability
H1 - Acceptance	-.11	.20
H1 - Awareness	-.31	p .01
H1 - Knowledge	-.20	.06
H1 - Complexity	.13	.16
H1 - Duration	.03	.40
H1 - Role Enactment	-.15	.13
H2 - Attitudes	-.44	p .001
H2 - Susceptibility	-.31	p .01
H2 - Attitudes and Susceptibility	-.47	p .001
H3 - Doctor-Patient Relationship	.02	.43
H3 - Family	-.05	.36
H3 - Living Situation	-.34	.01
H3 - Combined Effect of all Variables	-.24	.03
H4 - Significant Others	-.20	.06
* H4 - Support Group	-.57	p .001
H4 - Participation in Support Group and Significant Others	-.21	.04
H5 - Perceived Value	-.61	p .001
H5 - Validation	-.32	p .01
H5 - Perceived Value and Validation	-.50	p .001
H6 - All Hypotheses combined	-.44	p .001
H2 - IHLC	.27	.02
H2 - POHLC	-.17	.08
H2 - CHLC	-.18	.07
H2 - Evaluative Factor	.03	.41
H2 - Potency Factor	.20	.05
H2 - Activity Factor	.24	.03

* N = 25

Table 25 Summary of Group Comparisons with Hypotheses

Variable	Group	N	Min Score	Max Score	Median	Mean	S.D.	T-test T-score	T-test p.	Mann-Whitney U-test z score	Mann-Whitney U-test p.
H1 - Enactment of at risk role	1	21	1	15	6.2	6.9	3.6	1.95	.06	1.89	.06
	2	43	3	14	8.4	8.6	3.1				
H1 - Enactment of at risk role and complex & duration	1	21	-8	14	5.2	4.4	5.0	0.79	.43	0.70	.48
	2	43	-2	14	5.9	5.3	3.6				
H2 - Attitudes	1	21	-1	20	10.8	9.4	7.3	2.70	p<.01	2.16	.03
	2	43	2	24	14.8	13.7	5.2				
H2 - Susceptibility to M.D.	1	21	0	6	3.2	3.1	1.8	1.85	.07	1.83	.07
	2	43	0	6	4.1	3.9	1.6				
H2 - Attitudes and Susceptibility	1	21	-1	26	14.8	12.5	8.4	N/A	N/A	2.19	.03
	2	43	7	30	17.3	17.7	5.7				
H2 - Internal Health Locus of Control	1	21	14	36	25.0	26.1	6.4	.41	.68	0.32	.75
	2	43	13	36	25.3	25.5	5.0				
H2 - Powerful Others Health Locus of Control	1	21	10	32	19.3	20.1	6.0	1.73	.08	1.61	.10
	2	43	10	35	22.3	23.1	6.9				
H2 - Chance Health Locus of Control	1	21	7	27	16.7	17.7	6.0	0.11	.90	0.04	.96
	2	43	6	32	18.7	17.9	6.6				
H2 - Real Self Evaluative Factor	1	21	40	85	70.3	68.8	10.0	0.68	.50	0.52	.60
	2	43	43	86	71.3	70.4	8.6				

Table 25 (Continued)

H2 - Real Self Potency Factor	1	21	15	42	26.0	25.9	6.2	1.64	0.10	1.48	0.13
	2	43	15	34	23.4	23.7	4.4				
H2 - Real Self Activity Factor	1	21	10	28	20.3	19.5	4.4	1.56	0.12	1.50	0.13
	2	43	8	25	18.0	17.6	4.5				
H3 - Doctor Patient Relationship	1	21	-7	29	25.9	20.1	11.7	N/A	N/A	1.41	.16
	2	43	3	29	26.8	24.9	6.1				
H3 - Work	1	21	-1	5	0.1	0.3	1.2	0.38	.70	0.20	.83
	2	43	-4	5	0.1	0.2	1.2				
H3 - Family	1	21	-3	9	5.1	4.1	4.6	0.66	.51	0.26	.80
	2	43	-3	33	5.4	5.1	6.0				
H3 - Living Situation	1	21	1	11	5.1	5.2	2.9	1.68	.09	1.64	.10
	2	43	0	11	6.4	6.5	3.0				
H3 - Combined Effect of 4 Variables	1	21	4	47	29.0	29.7	13.2	2.33	.02	1.86	.06
	2	43	8	66	38.2	36.6	10.0				
H4 - Influence of Significant Others	1	21	-14	46	21.0	19.6	14.3	1.32	.19	1.52	.13
	2	43	-9	46	25.0	26.8	17.6				
H4 - Combined Effect of Participation in a Support Group and Significant Others	1	21	-14	46	20.8	19.8	14.3	1.49	.14	1.82	.07
	2	43	-9	51	26.0	27.0	17.6				
H5 - Perceived Value of Compliant Behaviour	1	21	-3	9	1.4	1.9	3.3	5.42	p<.001	4.36	p<.001
	2	43	0	13	6.1	6.1	2.7				

Table 25 (Continued)

H5 - Validation by Significant Others	1	21	-5	15	9.0	7.9	6.7	1.85	.07	1.74	.08
	2	43	-5	40	11.0	11.2	6.8				
H5 - Combined Effect of Perceived Value and Validation	1	21	-8	24	10	9.7	8.5	3.48	p<.001	3.27	p<.001
	2	43	-1	53	17.8	17.3	7.9				
H6 - Combined Effect of all Hypotheses	1	21	18	136	86.0	76.2	33.8	3.25	.002	2.91	.003
	2	43	20	185	102.7	104.7	32.6				

CHAPTER 5

DISCUSSION

Two main types of analyses have been used in the testing of the study's hypotheses. These included: testing for between group differences, and correlational testing for relationships between variables. These analyses highlight something different about each variable.

When comparing variables between groups as the sole means of analysis, one is adopting the individualistic approach in testing for variables which differentiate compliers from noncompliers. Analyses indicate whether or not significant differences exist between groups. On the other hand, correlational analyses indicate whether or not a relationship exists, in this case, between one or more variables and reported noncompliance.

Frequently throughout the results there are variables with statistically significant correlations with reported noncompliance, and results which are not significant in between group analyses of the same variable. It is proposed that because of the arbitrary fashion with which subjects in compliance studies are categorised as either compliers or noncompliers, this technique does not accurately account for the importance of variables in the overall problem of noncompliance.

Reviewing methods of classifying compliers and non-compliers Gordis (1979) mentions three particular methods.

These are: 1) spliting a sample on the basis of a biological decision, i.e. level of compliance necessary to achieve a therapeutic response, 2) statistical classifications where the median level of compliance in a group of patients is used as the discriminative variable amongst groups, and 3) arbitrarily choosing a level of compliance as a discriminative variable amongst groups. The third method was used in this study and is considered by Gordis to be the more common method.

It is thought by the author that because these methods do not use a standardised level of noncompliance as a discriminative variable in differentiating compliant and noncompliant subjects, it is possible for the results of different studies to contradict one another unnecessarily when different levels of noncompliance are used to differentiate compliers and noncompliers. To overcome this problem and encourage consistency amongst findings it is proposed that the use of correlational analyses of variables being tested, should be supported.

Since the design of this study incorporated the differentiation of compliant and noncompliant groups, between group analyses and correlational analyses have been reported and discussed in both the results and discussion sections. The group distinction has also allowed for: 1) analysis of discrete variables which only allow for comparisons between groups, and 2) comparison of results with other study findings where applicable.

Hypothesis 1

Although two of the first three variables individually correlated with reported noncompliance did not show significant results, it is interesting that the correlational analysis of the three variables combined did show a statistically significant negative relationship. However, the between group analysis of these three variables combined was not significant.

Further correlational analyses indicated that neither complexity nor duration of medication regimens showed a significant relationship with reported noncompliance. The between group analysis also failed to show a difference. These findings contradict those of a number of studies which have reported group differences with these two variables.

These final results may have been affected by two factors: 1) use of an insensitive measurement of complexity and duration, e.g. the categorisation of duration into yearly categories would not have been as sensitive to smaller intervals as if the categories had represented monthly intervals. 2) Alternatively discrepant data affected by the use of a self-report measurement of compliance may have confounded the results. Nevertheless the confidence levels associated with the analyses of both variables were very low and it is questionable whether or not more accurate levels of noncompliance and subsequent differentiation of group members would alter the confidence levels to any great extent.

On the other hand it may be that complexity and duration of medication regimens are not important determinants of compliance for these subjects. A revision of studies

focusing upon these two variables indicate that in the majority of cases the populations sampled consisted of nonpsychiatric populations with nonpsychiatric conditions, e.g. compliance with medication for cardiovascular, tubercular, hypertensive and contraceptive problems, and medication compliance by outpatients of general medical wards, and amongst elderly people.

An assumption was made that the interaction of the first three variables represented enactment of the at risk role. Based upon this assumption the finding that the combination of all five variables did not show a significant relationship with reported noncompliance, supported by the failure of the between group analysis to show a difference rejects the modified version of hypothesis 1. This hypothesised that knowledge in enacting the at risk role is likely to be associated with higher compliance, and that this is subsequently mediated through the complexity and duration of the medication regimen.

Nevertheless, these findings may also have been affected by the same factors which possibly affected the findings of complexity and duration.

The omission from the analysis of the variable 'competency' does not enable an accurate examination of the original hypothesis to be made. However, until competency is operationally defined and measurable in an unobtrusive manner it is likely to remain untested.

Hypothesis 2

Assuming the interaction of personal attitudes towards having manic depression and susceptibility to manic depression

represents the extent to which the at risk role has been incorporated into the self-concept, the correlational analysis of the combined effect of these two variables support hypothesis two. These correlational findings are supported by a statistically significant difference between groups. Both findings are statistically significant and confirm the second hypothesis that compliance is maximised when there is evidence that the sick or at risk roles have been incorporated into the self-concept of the client.

The finding that susceptibility to manic depression (insight) did not show a statistically significant difference between groups is contrary to past research findings by del Campo et al (1983) and Van Putten et al (1976). A possible reason for this contradiction may be due to different discriminating variables used by both studies in differentiating between the compliant and non-compliant groups.

The measurement of self-concept results showed no significant differences between groups although two statistically significant positive relationships were found between the potency and activity factors and reported noncompliance. The failure to replicate past factorial analyses of the three factors used, raises questions about the accuracy of any interpretation of the findings. Consequently no interpretation was attempted. It is thought that the failure to replicate past factorial analyses could have been affected by either the sample size being too small or possibly the sample.

Despite the between group analyses of the MHLC scores which were not significant, the IHLC scores indicated a

statistically significant positive correlation with reported noncompliance. This contradicts the findings of Anderson et al (1982) and B.S. Wallston and Wallston (1978a) who reported that internally oriented individuals generally showed more compliant behaviour than externally oriented individuals.

Although the findings from this study contradict the findings of other studies, it would appear realistic to propose that these findings may occur. It would appear feasible that compliance may be characterised by a predominant powerful others health locus of control (where upon an individual is compliant due to the influence of his or her doctor), while internal health loci of control were neither characteristic of compliance nor noncompliance. This is suggested since basically individuals with a predominant IHLC do as they please which may involve being either compliant or noncompliant.

Hypothesis 3

As found in the analysis of hypothesis one, once again a statistically significant negative relationship has been found between the combined effects of a number of variables and reported noncompliance, when less than half the contributing variables independently showed such a significant relationship. Nevertheless, assuming the four roles studied are typical of roles subjects are likely to find themselves in, the results confirm the hypothesis that compliance is enhanced when relevant other roles are congruent and/or complementary with client roles.

Amongst the four roles examined: doctor-patient relationship, work, family and living situation, satisfaction with living situation was the only one to show a statistically significant negative relationship with reported noncompliance. These findings suggest that the effects of the four roles interact to create a relationship with noncompliance which independently three of the four roles do not create. As the interactional model proposes it may be that the interaction of a number of variables is more important in determining compliance than investigation of individual variables. It also appears to indicate that what may appear to be an insignificant variable in determining compliance may become important in combination with other variables.

The chi^2 analyses performed in addition to the above tests found three notable results. 1) Contrary to Dietrich and Marton (1982), continuity of the doctor-patient relationship determined by whether subjects had been patients of their doctor's for less than or longer than one year, did not differentiate compliers from noncompliers. Results may have been affected by unequal group differentiation between studies or limited response categories not sensitive enough to longer periods of time. However, as with the earlier findings of complexity and duration as determinants of compliance, the majority of studies which related to continuity of the doctor-patient relationship did not involve psychiatric disorders, e.g. compliance with: oral penicillin, pediatric, and hypertensive medication regimens. 2) Contrary to Korsch and her colleagues (as noted by Jay et al, 1984), the type of relationship subjects had with their individual doctor, e.g. authoritarian versus mutual, did not differen-

tiate the two groups. 3) Contrary to Porter (1969) type of living situation did not differentiate the two groups and in particular living alone was not notably associated with the noncompliers.

The results of the last two points may have been affected by unequal group differentiation between studies. Note is also made that Porter's (1969) study related to general practice patients on chronic medication.

It was noticed in earlier analyses that some data which have not shown statistically significant differences between groups have nevertheless shown statistically significant relationships with reported noncompliance. It is therefore unfortunate that due to the nature of the data being analysed within the chi^2 analysis, testing was restricted to between group comparisons.

Hypothesis 4

Assuming that the influence of significant others coupled with participation or lack of it in a support group represents the degree of reinforcement by significant others and other reference group, the correlational analysis of the combined effects of both variables with reported non-compliance confirms hypothesis four. Nevertheless caution is necessary when interpreting the results, e.g. although membership to a support group showed a statistically significant result when compared between the compliant and noncompliant groups, it is questionable whether or not such support groups actually encourage compliance or alternatively attract mostly compliant individuals. Further research is necessary to investigate this question.

The relative relationship of perceived helpfulness of support groups to reported noncompliance was statistically significant showing that the more helpful subjects found the support group, the more compliant they were likely to be. This was illustrated by the finding that both non-compliant subjects who belonged to support groups did not find them helpful while in contrast only one of the twenty-three compliant subjects did not find his or her group helpful. However, because the statistical analysis only refers to a correlational relationship between perceived helpfulness of support groups and reported noncompliance, no specific conclusions can be made other than to say that a statistically significant negative relationship exists between the two variables.

Although the majority of subjects belonging to a group belonged to the Manic Depressive Society's support group, it was evident that there were a number of different groups available to people seeking help in coping with manic depression.

Although the correlational analysis of the combined effects of the two variables confirms the hypothesis, the results from a between groups analysis of the same data were not significant. Considering that the focus of the statistical analysis was upon the correlational analyses of variables with reported noncompliance, the results confirm hypothesis four, that compliance is enhanced if the compliance role is reinforced by significant others and other reference groups.

Hypothesis 5

Assuming that both the variables tested: 1) perceived value of compliance behaviours by the subjects, and 2) validation of medication compliance by significant others, adequately represent the degree to which behaviours of compliance are judged valuable by the client and are validated by significant others, the statistical analysis confirms hypothesis five.

As in many other instances, although the correlational analyses of both variables showed statistically significant negative relationships with reported noncompliance only one of the two variables, perceived value of compliance behaviours by the subject, showed a statistically significant difference between the two groups.

Nevertheless both the correlational and between group analyses of the combined effect of both variables showed statistically significant results. This confirmed that the level and extent of a client's compliance with a health care regimen depends on the degree to which behaviours of compliance are judged valuable by the client and are validated by significant others.

Hypothesis 6

Hypothesis six proposed that all four components of role enactment: 1) compliance role enactment, 2) incorporation of role into self-concept, 3) counter roles, and 4) periodic evaluation of role, had to be present for compliance to occur.

The dominant statistical analysis used to confirm or reject the other hypotheses has been the correlational analysis. However, the wording of this hypothesis appears

more suited to a between groups analysis where compliance is implied as either present or absent. Using the most appropriate form of analysis and based upon the assumption that statistically significant findings of a combination of variables constituting an hypothesis, confirm that hypothesis, the t-test used in this analysis confirmed hypothesis six.

A correlational analysis performed also showed a statistically significant result indicating a strong negative relationship between the cumulative scores of all hypotheses and reported noncompliance.

While both findings theoretically confirm hypothesis six, consideration of individual hypotheses does not. Based upon the assumption that confirmation of specific hypotheses subsequently confirm the presence of the applicable component, examination of the analyses of all prior hypotheses indicate that compliance role enactment as tested in hypothesis one was rejected by both between groups and correlational analyses. All other hypotheseswere confirmed by either the correlational and/or between groups analyses.

This finding where the combined effect of two or more variables has shown a statistically significant result, when not all of the variables individually have shown such results has also been found in past correlational and between groups analyses. As before it is assumed that the combined effect of all the variables involved interact to create a 'variable' which in this case is closely related to reported noncompliance and distinguishes compliers from noncompliers, which not all the variables independently are able to do.

The correlational coefficient derived was -.44. When squared (.1936), it provides an estimate of the degree of

variance of the dependent variable, accounted for by the independent variable assuming a linear relationship. In other words the combined effect of all variables considered in hypothesis six account for less than 20% of the variance of the reported noncompliance assuming a linear relationship. When considering the relatively large number of variables examined in this hypothesis, 20% of the variance still leaves a considerable amount of variance unaccounted for.

Although not used it would have been interesting to have performed a multiple regression analysis upon the variables tested to examine which variables accounted for the greatest amount of variance.

Based upon the assumption that this hypothesis underlies the interactional model, analysis of the data suggests a strong tendency for medication noncompliance to be affected by a number of interacting variables associated with role theory. However, it would be inappropriate to make any specific conclusions regarding validation of this model from this study considering no other reported studies have used it. Nevertheless the results produced appear to support the application of the interactional model to research of medication compliance and possibly health care compliance also. Reflecting upon this study's findings there is plenty of scope for additional research using this model.

Sociodemographic Variables

The sociodemographic variables analysed in this study found two variables: marital status and age which differentiated the two groups with statistical significance. These were similar to the findings of Jamison and Akiskal (1983)

concerning the apparent effect of three sociodemograhpic variables upon lithium compliance. They reported that married individuals, females and increasing age amongst subjects tended to be associated with better compliance. Similarly, this study found being married was associated with better compliance but it also found that divorced, separated or widowed subjects also tended to be more compliant. Concerning age amongst subjects, the age period between 20 and 29 years was the most representative of non-compliance while subjects 30 years and over were mainly compliant. Sex was not found to have any effect in distinguishing groups.

The findings concerning marriage may be due to the influence of married subjects not wanting to disrupt their home life or alternatively may be due to having more supervision with respect to their medication taking. However, neither of these explanations adequately apply to subjects who are divorced, separated or widowed, who also had a tendency to be compliant. Nevertheless, married subjects showed a considerably greater probability than either of these other groups, of being compliant.

The tendency for single people to be noncompliant appears to be closely related to subjects in the 20-29 year age group who also showed a greater tendency to be non-compliant.

Compliance Variables

Considering the focus upon studying compliance as a continuous variable it was unfortunate that analysis of Kucera-Bozarth's self-report compliance questionnaire was

restricted to a chi^2 analysis. Nevertheless, with consideration to the validity of this questionnaire it was encouraging that each question as presented in its modified form showed a statistically significant difference between the two groups. As a method of measurement however, it remains limited by its dependency upon self-report. It requires further studies to help validate it as a measurement technique. In the meantime, where available, it would be beneficial to include other more objective methods of measurement in addition to this questionnaire when measuring noncompliance.

The non-significant finding between groups of time, since subjects had their serum lithium levels last tested suggests that compliant subjects tend to overlook having blood tests as often as noncompliant subjects. Although results may have been affected by the dichotomous categorisation of: three months and over, or under three months, used when classifying subjects this was chosen because of the three monthly blood tests recommended to most lithium users.

Findings from the analysis of whether or not subjects had been previously noncompliant showed significant results. The findings indicated that the majority of compliant subjects had never been noncompliant while the majority of noncompliant subjects had been noncompliant more than once before. These findings support the suggestion by Jamison and Akiskal (1983, p.179), that two major types of manic depressives appear to exist: 1) those who would never consider being noncompliant and never have been, and 2) those who have been, and will probably continue to be occasionally noncompliant.

Individual awareness of consequences of lithium noncompliance also showed a statistically significant difference

between groups. Results indicated that subjects who had developed some conscious insight into the detrimental consequences that may be associated with noncompliance were more likely to be compliant while the opposite was the case for noncompliers. Nevertheless it is apparent from the results that this is not enough by itself to ensure compliance.

Summary of results

This section summarises the findings of the study in order of the six hypotheses tested and finished with conclusions regarding these findings.

This study found significant negative correlations between a number of individual and combined variables, and reported noncompliance. The following conclusions were made in respect to these findings.

Hypothesis 1 rejected, that knowledge in enacting the at risk role is likely to be associated with higher compliance, which is subsequently medicated through the complexity and duration of the medication regimen.

Hypothesis 2 confirmed, that compliance is maximised when there is evidence that the sick or at risk role has been incorporated into the self concept of the client.

Hypothesis 3 confirmed, that compliance is enhanced when relevant other roles are congruent and/or complementary with client roles.

Hypothesis 4 confirmed, that compliance is enhanced

if the compliance role is reinforced by significant others and other reference groups.

Hypothesis 5 confirmed, that the level and extent of a client's compliance with a health care regimen depends on the degree to which behaviours of compliance are judged valuable by the client and are validated by significant others.

Hypothesis 6 found that the combined effect of all variables showed a statistically significant negative relationship with reported noncompliance, confirming statistically that all four components of role enactment have to be present for compliance to occur. However, when individually examined, compliance role enactment as tested in hypothesis one was not present.

A number of additional issues not directly related to the six hypotheses but pertinent to the study, such as MHLC, self-concept and continuity of DPR, although not mentioned in this summary were investigated. For information on the findings regarding these issues the reader should consult the relevant parts of the discussion section.

Methodological considerations

The results of this investigation into lithium compliance amongst manic depressives need to be viewed with some caution given the following methodological limitations: 1) use of self-report for the majority of information collected which may have introduced a number of contaminating factors, 2) the large number of assumptions made about variables without adequate validation, and 3) use of a selective sample.

Although some of these limitations, i.e. lack of validation, may be improved upon in future research, other problems in the study are characteristic of research in this area, e.g. lack of accurate measurements of compliance, and need to be accepted as such.

For obvious reasons it was desired to compare the findings of this study with the findings of other relevant studies. Unfortunately the operational definitions used in the studies frequently differed creating problems for such comparisons. To overcome this problem both correlational and between groups analyses were applied. At times this created confusion in that a finding was occasionally significant under one form of analysis and not under the other. To some extent this limited the clarity of conclusions that could be made.

It is hoped that this study will provide a basis for future research into lithium compliance by manic depressives. The findings of some hypotheses have been affected by lack of an adequate definition by Dracup and Meleis (1982) and future research to study this model will also no doubt be affected by it.

A suggestion which may assist future researchers is to use a sample large enough to allow for differential testing between different levels of noncompliance. This would help to avoid the problems caused by the lack of a standardised cut-off point between compliance and noncompliance.

Conclusion

This study has found that while some individual variables may not show significant correlations with compliance/non-

compliance of medication, when combined, many of these same variables do show significant correlations. This provides strong support for the use of an interactional model in the study of medication compliance.

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APPENDIX 1

INTRODUCTORY LETTER

Department of Psychology
University of Canterbury Christchurch 1 New Zealand

38 Plynlimon Road,
Bryndwr,
Christchurch 5.
25 August 1984

Dear

Greetings. My name is Fiona Macintyre, and I am a trainee psychologist. I have been involved in the area of manic depression for the past 1½ years, during which time I have talked to many individuals with the disorder.

At present I am involved in a study which you may be interested in helping me with. I am studying the effects of manic depression on people's lives, looking in particular at individual attitudes towards the disorder, the attitudes of others towards those with manic depression, and different aspects of medication associated with manic depression. I am especially interested in contacting individuals who are presently being prescribed lithium, either by itself or in combination with other medication. This includes people with both favourable and unfavourable impressions of lithium.

If you feel you could help, I would be very grateful to hear from you and will be happy to answer any questions you may have. My telephone number is ---- and if there is no reply, I may be contacted at --- where a message may otherwise be left.

Thankyou very much for your help and attention.

Yours faithfully,

Fiona R. Macintyre (Miss)

APPENDIX 2

Department of Psychology
University of Canterbury Christchurch 1 New Zealand

MEASUREMENT OF SELF-CONCEPT

The purpose of this study is to learn more about manic depression. This includes studying personal attitudes towards the disorder, effects it has on people's lives and factors which may affect the disorder itself.

The study is divided into three sections : A, B and C.

SECTION A : examines how individuals see themselves.

SECTION B : examines individual attitudes, families, aspects of medication and attitudes of others towards those with manic depression.

SECTION C : examines more personal attitudes towards health.

CONFIDENTIALITY : Answers from all questionnaires are kept strictly confidential. No individual names are required on the questionnaires and no names will be used in reporting the results.

CONSENT : Due to the nature of this research it may be necessary to contact individual doctors to obtain confirmation of admission dates to hospital, specific medication information and possibly other relevant information. In the case of such a necessity, written consent from the individual concerned is required. This can be given by signing the statement below.

I am very grateful to everyone who has agreed to participate in this study. Thank you very much for your time and co-operation.

Fiona Macintyre.

I have read about the purpose of this study and understand the answers are completely confidential. I also understand the possible necessity to obtain relevant information from my doctor and agree to give my consent to this.

_____ _____

Signature Date

INSTRUCTIONS FOR SECTION A

The purpose of this first study is to get a better understanding of how you perceive yourself (you as you really are). It requires you to rate yourself against a series of descriptive scales.

On the next page are numerous scales on which to rate yourself as accurately as possible. If you feel that you are very closely characterised by one end of the scale, you should place your check mark as follows:

FAIR _X_ : ___ : ___ : ___ : ___ : ___ : ___ UNFAIR

OR

FAIR ___ : ___ : ___ : ___ : ___ : ___ : _X_ UNFAIR

If you feel you are quite closely characterised by one or the other end of the scale (but not extremely), you should place your check mark as follows:

STRONG ___ : _X_ : ___ : ___ : ___ : __ : ___ WEAK

OR

STRONG ___ : ___ : ___ : ___ : ___ : _X_ : ___ WEAK

If you are only slightly characterised by one side as opposed to the other side (but are not really neutral), then you should check as follows:

ACTIVE ___ : ___ : _X_ : ___ : ___ : ___ : ___ PASSIVE

OR

ACTIVE ___ : ___ : ___ : ___ : _X_ : ___ : ___ PASSIVE

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of you.

If you consider yourself to be neutral on the scale, both sides of the scale are equally characteristic of you, or if the scale is thought to be completely irrelevant and unrelated to you, then you should place your check mark in the middle space:

SAFE ___ : ___ : ___ : _X_ : ___ : ___ : ___ DANGEROUS

IMPORTANT:

1. Place your check marks in the middle of spaces, not on the boundaries:

		This		Not This	
___ :	___ :	___ :	_X_ :	___ :	___X___

2. Be sure you check every scale - do not omit any.

3. Never put more than one check-mark on a single scale.

4. Remember to rate yourself according to your real self, who only you know best.

ME (AS I REALLY AM)

WISE	___:___:___:___:___:___:___	FOOLISH
PASSIVE	___:___:___:___:___:___:___	ACTIVE
HONEST	___:___:___:___:___:___:___	DISHONEST
SOFT	___:___:___:___:___:___:___	HARD
PESSIMISTIC	___:___:___:___:___:___:___	OPTIMISTIC
FREE	___:___:___:___:___:___:___	INHIBITED
UNGRATEFUL	___:___:___:___:___:___:___	GRATEFUL
MOTIVATED	___:___:___:___:___:___:___	UNMOTIVATED
UNFRIENDLY	___:___:___:___:___:___:___	FRIENDLY
BRAVE	___:___:___:___:___:___:___	COWARDLY
CRUEL	___:___:___:___:___:___:___	KIND
MASCULINE	___:___:___:___:___:___:___	FEMININE
GOOD	___:___:___:___:___:___:___	BAD
SICK	___:___:___:___:___:___:___	HEALTHY
IMPORTANT	___:___:___:___:___:___:___	UNIMPORTANT
SLOW	___:___:___:___:___:___:___	FAST
CLEAN	___:___:___:___:___:___:___	DIRTY
SERIOUS	___:___:___:___:___:___:___	HUMOROUS
UNSUCCESSFUL	___:___:___:___:___:___:___	SUCCESSFUL
STRONG	___:___:___:___:___:___:___	WEAK
SELFISH	___:___:___:___:___:___:___	UNSELFISH
EXCITABLE	___:___:___:___:___:___:___	CALM
UGLY	___:___:___:___:___:___:___	BEAUTIFUL

APPENDIX 3

SCORING PROCEDURE FOR THE MEASUREMENT OF SELF-CONCEPT

Each scale included in the measurement of the self-concept instrument represents the measurement of either an evaluative (E), potency (P) or activity (A) factor. The representation of each scale is expressed down the left hand side of the instrument.

Scoring involved assigning a numerical score between 1 and 7 inclusive, to each of the 23 scales. The score attributed to the subject's position on the scale is determined by the extreme scores featured at both ends of each scale.

Factorial scores represented the accumulated scores of all the scales incorporating that factor.

APPENDIX

ME (AS I REALLY AM)

		6	5	4	3	2	1	
(E)	WISE	7					1	FOOLISH
(A)	PASSIVE	1					7	ACTIVE
(E)	HONEST	7					1	DISHONEST
(P)	SOFT	1					7	HARD
(E)	PESSIMISTIC	1					7	OPTIMISTIC
(P)	FREE	7					1	INHIBITED
(E)	UNGRATEFUL	1					7	GRATEFUL
(A)	MOTIVATED	7					1	UNMOTIVATED
(E)	UNFRIENDLY	1					7	FRIENDLY
(P)	BRAVE	7					1	COWARDLY
(E)	CRUEL	1					7	KIND
(P)	MASCULINE	7					1	FEMININE
(E)	GOOD	7					1	BAD
(E)	SICK	1					7	HEALTHY
(E)	IMPORTANT	7					1	UNIMPORTANT
(A)	SLOW	1					7	FAST
(E)	CLEAN	7					1	DIRTY
(P)	SERIOUS	7					1	HUMOROUS
(E)	UNSUCCESSFUL	1					7	SUCCESSFUL
(P)	STRONG	7					1	WEAK
(E)	SELFISH	1					7	UNSELFISH
(A)	EXCITABLE	7					1	CALM
(E)	UGLY	1					7	BEAUTIFUL
		2	3	4	5	6		

APPENDIX 4

MEASUREMENT OF ATTITUDES AND MEDICATION COMPLIANCE

The purpose of this second section is to learn more about individual attitudes towards having manic depression, attitudes of others towards those with manic depression in addition to gaining more information about aspects of medication.

Please try and answer all questions according to the directions given. If you are unsure or unclear about a question or how to answer it, please ask me to explain.

Please answer all questions as honestly as you can, as this is especially important for the study. All answers are STRICTLY CONFIDENTIAL.

---

1. What is your marital status? (tick appropriate box)
   - ( ) single
   - ( ) married
   - ( ) divorced, separated, widowed

2. What is your sex?
   - ( ) male
   - ( ) female

3. What is your age?
   - ( ) under 20 years
   - ( ) 20 - 29 years
   - ( ) 30 - 39 years
   - ( ) 40 - 49 years
   - ( ) 50 years and over

4. Who is there in your immediate family?

5. Are you employed in either a voluntary or paid job?
   - ( ) yes - paid
   - ( ) yes - voluntary
   - ( ) no

   If yes, what is your job?

6. How important is this job to you? (mark 1 space according to degree of importance)

___:___:___:___
not important — extremely important

( ) N/A

7. Highest level of education, either fully or partially completed (tick 1)

( ) primary (up to form 3)

( ) secondary (form 3 to form 7)

( ) school certificate

( ) university entrance

( ) bursary or scholarship

( ) tertiary (education beyond secondary school)
if tertiary please specify

_____

8. Have any other family members or relatives been diagnosed as having manic depression?

( ) yes

( ) no

( ) don't know

If yes, please specify which relatives, e.g. father.

_____

9. How long ago were you told you had manic depression?

( ) under 1 year

( ) 1 - 2 years

( ) 2 - 3 years

( ) over 3 years

10. When were you last admitted to hospital because of your manic depression?

_____

11. How long were you in hospital during your last admission?

_____

12. What do you think is the likelihood of your experiencing an episode of either mania or depression if you <u>don't</u> take lithium?

( ) high

( ) average

( ) low

( ) don't know

13. What do you think is the likelihood of your experiencing an episode of either mania or depression when you do take lithium?

( ) high

( ) average

( ) low

( ) don't know

14. How many lithium are you taking each day? e.g. 1 three times daily.

_____

15. How many different types of pills, prescribed by your doctor, do you take daily?

( ) one

( ) two

( ) three or more

( ) don't know

16. How frequently do you have to take each type of pill? (Make one tick for each type).

once a day

twice a day

three or more times a day

don't know

17. How long have you been on lithium since the first time you were prescribed it?

( ) less than a year

( ) 1 - 2 years

( ) 2 - 3 years

( ) over three years

( ) don't know

....Question 18

18. Are there any reasons you might not follow your doctor's advice to take lithium?

( ) yes

( ) no

If yes, please tick the reasons that are applicable:

( ) unpleasant side effects

( ) not satisfied with my doctor

( ) I don't understand why I should take it

( ) I don't think I need it anymore

( ) I don't think it works for me

( ) It is too complicated to take

( ) I sometimes forget to take it

( ) My family or friends convince me I don't need it

( ) It slows me down too much

( ) I miss my highs

( ) I have difficulty getting my prescriptions filled

( ) I don't like having any blood samples taken off

( ) Other (please specify)

_____

19. How do you find having to take lithium daily?

___:___:___:___

not bothersome — extremely bothersome

20. Does it bother you that your moods could be controlled by lithium?

( ) yes

( ) no

21. How do you find talking to other people about having manic depression?

___:___:___:___:___:___:___

extremely difficult — neutral — extremely easy

22. How does the idea of returning to hospital make you feel?

___:___:___:___

not uncomfortable — extremely uncomfortable

23. How easy have you found it to accept that you have manic depression?

___:___:___:___:___:___:___

extremely difficult — neutral — extremely easy

24. What doctor(s) have you been seeing in the last 12 months about your manic depression - discussing the disorder, getting prescriptions etc. (Please write names and locations)

_____

_____

_____

If more than one, who is the more important to you regarding treatment of your manic depression.

25. How long have you been a patient of his/hers?

( ) less than 1 year

( ) longer than 1 year

( ) don't know

The next questions 26-36 refer to the doctor most important to you for your manic depression.

26. Tick five words which best describe your doctor's attitude towards you.

( )	cold	( )	rejecting
( )	good natured	( )	respectful
( )	helpful	( )	superficial
( )	indifferent	( )	sympathetic
( )	insincere	( )	understanding
( )	obliging	( )	unfriendly
( )	impatient	( )	unsupportive
( )	reassuring	( )	warm

27. Tick five words which best describe your doctor's treatment of your manic depression?

( )	attentive	( )	inexperienced
( )	competent	( )	knowledgeable
( )	confident	( )	proficient
( )	efficient	( )	skilled
( )	ignorant	( )	slack
( )	inattentive	( )	sloppy
( )	incompetent	( )	thorough
( )	inefficient	( )	unskilled

28. What degree of support and encouragement does your doctor give you for your manic depression?

___:___:___:___

not supportive — extremely supportive

29. How much confidence do you have in your doctor?

___:___:___:___

no confidence — a great deal of confidence

30. Does your doctor spend enough time with you at each consultation?

( ) yes

( ) no

31. How satisfied are you with the level of communication between your doctor and yourself?

___:___:___:___:___:___:___

extremely unsatisfied — neutral — extremely satisfied

32. After talking to your doctor about your problems, how satisfied are you with the amount of feedback he gives you?

___:___:___:___:___:___:___

extremely unsatisfied — neutral — extremely satisfied

33. How approachable has your doctor been when you have wanted to discuss your lithium, e.g. side effects etc.

___:___:___:___:___:___:___

extremely unapproachable — neutral — extremely approachable

34. Does your doctor explain instructions to you clearly, making sure you understand them?

( ) always

( ) usually

( ) never

35. Which description best describes the relationship you have with your doctor?

( ) your doctor takes the major responsibility for any decisions made and your responsibility is in co-operating with these decisions

( ) both your doctor and yourself have approximately equal responsibility in any decisions made

36. Are you satisfied with this relationship?

( ) Yes

( ) No

37. If you are working in a job, whether paid or voluntary, what do you think the consequences would be if you were hospitalised for your manic depression?

( ) my job would probably be kept open for me

( ) my job probably would not be kept open for me

( ) other (please specify) _____

( ) N/A

38. What is your current living situation?

( ) live by yourself

( ) live with other family members

( ) live with others (not family) e.g. flatting

( ) other (please specify) _____

39. Are you satisfied with your current living situation?

( ) yes

( ) no

40. Do the others you live with know you have manic depression?

( ) yes

( ) no

( ) some

( ) N/A

41. In general what degree of support for your manic depression do you receive from those you live with?

___:___:___:___

( ) N/A no support a great deal of support

42. What effect would it have on your present living arrangements if you experienced an episode of mania?

___:___:___:___

not disruptive extremely disruptive

43. What effect would it have on your present living arrangements if you experienced an episode of depression?

___:___:___:___

not disruptive extremely disruptive

44. What degree of support for your manic depression do you receive from family members.

___:___:___:___

( ) N/A no support a great deal of support

45. What effect would it have on your family if you experienced an episode of mania?

___:___:___:___

not disruptive — extremely disruptive

( ) N/A

46. What effect would it have on your family if you experienced an episode of depression?

___:___:___:___

not disruptive — extremely disruptive

47. Do you belong to a support group for your manic depression?

( ) yes

( ) no

If yes, what is it's name (please specify) _____

48. How long have you been a member of it?

( ) less than 6 months

( ) 6 months to 1 year

( ) 1 - 2 years

( ) over 2 years

( ) N/A

49. How frequently does your group meet? (Please specify) _____

( ) N/A

50. How frequently do you attend?

( ) at least twice out of every three meetings

( ) about once every two meetings

( ) less frequently than once every two meetings

( ) N/A

51. How well do you feel the meetings help you cope with your manic depression?

___:___:___:___

not helpful — extremely helpful

( ) N/A

52. The term 'significant other' is applied to someone who is important to you and influences your behaviour in either a positive or negative way. Label up to 5 people who you consider to be a significant other in your life, using the letters A, B, C, D & E. (The letters do not indicate any particular order).

Mother	Boyfriend
Father	Girlfriend
Husband	Doctor
Wife	Psychologist
Sister(s)	Support Group Members
Brother(s)	Children
Boss	Flatmate(s)
Fellow workers	Other (specify)
Friend(s)	

53. What degree of support and understanding does each person provide you with? (Put letter of each significant other beside appropriate response. More than one letter can be put beside each choice).

a great deal of support

some support

little support

no support

54. Where does each person stand with respect to checking whether or not you take your lithium?

they nag me about it

they often ask if I have taken it

they ask questions only if they feel something is different

they don't ask questions, but leave the responsibility for taking my pills up to me.

they don't know I have manic depression

other (please specify)

55. How noticeable would it be to each person if you had not taken your lithium for 5 days?

extremely noticeable

quite noticeable

slightly noticeable

not noticeable

don't know

56. How important do you think it is to each person that you take your lithium regularly?

extremely important

quite important

slightly important

not important

57. What is your personal feeling towards the use of medication for treating psychological disorders?

___:___:___:___:___:___:___

intense personal dislike — neutral — strong personal liking

58. What part does medication play in helping you cope with manic depression?

___:___:___:___

not important — extremely important

59. In the last two weeks, have you ever missed a dose of lithium?

( ) no

( ) yes

If yes, how many times? _____

60. In the last two weeks, have you always taken your lithium at the times of day you were instructed?

( ) no

( ) yes

61. In the last two weeks, have you taken the number of lithium prescribed each day?

( ) no

( ) yes

If no, did you take more? ( ) or less? ( )

62. How important is it to you to take your medication as directed by your doctor?

___:___:___:___

not important — extremely important

63. When did you last have a blood test to check your lithium levels?

( ) within the last 2 weeks

( ) 2 weeks - 3 months ago

( ) over 3 months ago

64. Have you ever taken yourself off lithium without your doctor's knowledge?

( ) yes

( ) no

If yes, how many times have you done this?

If yes, for how long on average?

65. When did you do this?

( ) N/A

66. What were the general consequences of having done this?

( ) N/A

APPENDIX 5

SCORING PROCEDURE FOR MEASUREMENT OF ATTITUDES AND MEDICATION COMPLIANCE

Responses to questions in Section B were scored according to the values assigned to each option as set out below. With reference to Table 1, the scores of appropriate questions were added together to represent variables which were ultimately used in group comparisons and correlational analyses. The discrete data produced were compared between groups.

In accordance with the specific hypothesis being tested the scores were arranged so that the greater the positive score the greater the likelihood of the subject being compliant. Similarly the smaller the score the greater the likelihood of the subject being noncompliant.

SECTION B

The purpose of this second section is to learn more about individual attitudes towards having manic depression, attitudes of others towards those with manic depression in addition to gaining more information about aspects of medication.

Please try and answer all questions according to the directions given. If you are unsure or unclear about a question or how to answer it, please ask me to explain.

Please answer all questions as honestly as you can, as this is especially important for the study. All answers are STRICTLY CONFIDENTIAL.

---

1. What is your marital status? (tick appropriate box)
   - (1) single
   - (2) married
   - (3) divorced, separated, widowed

2. What is your sex?
   - (1) male
   - (2) female

3. What is your age?
   - (1) under 20 years
   - (2) 20 - 29 years
   - (3) 30 - 39 years
   - (4) 40 - 49 years
   - (5) 50 years and over

4. Who is there in your immediate family?

   wife (1) husband (2) N/A (0)
   No. of children
   No. of parents, including inlaws
   No. of brothers and sisters, including inlaws

5. Are you employed in either a voluntary or paid job?
   - (2) yes - paid
   - (1) yes - voluntary
   - (0) no

   If yes, what is your job?

6. How important is this job to you? (mark 1 space according to degree of importance)

-2	:	1	:	2	:	3
not important						extremely important

(0) N/A

7. Highest level of education, either fully or partially completed (tick 1)

(1) primary (up to form 3)

(2) secondary (form 3 to form 7)

(3) school certificate

(4) university entrance

(5) bursary or scholarship

(6) tertiary (education beyond secondary school)
if tertiary please specify

_____

8. Have any other family members or relatives been diagnosed as having manic depression?

(1) yes

(2) no

(0) don't know

If yes, please specify which relatives, e.g. father.

_____

9. How long ago were your told you had manic depression?

(1) under 1 year

(2) 1 - 2 years

(3) 2 - 3 years

(4) over 3 years

* 10. When were you last admitted to hospital because of your manic depression?

(1) 0-1yr.ago (2) 1-2 yrs.ago. (3) over 2 yrs.ago. (0) don't know

* 11. How long were you in hospital during your last admission?

(1) 0-1 mth, (2) 1-3 mths, (3) 3-6 mths, (4) over 6 mths. (0) don't know

12. What do you think is the likelihood of your experiencing an episode of either mania or depression if you don't take lithium?

(3) high

(2) average

(1) low

(0) don't know

* Responses to these questions were confirmed with medical records.

13. What do you think is the likelihood of your experiencing an episode of either mania or depression when you do take lithium?

(1) high

(2) average

(3) low

(0) don't know

** 14. How many lithium are you taking each day? e.g. 1 three times daily.

Knowledge Score 2 if correct 0 if wrong or don't know

** 15. How many different types of pills, prescribed by your doctor, do you take daily?

Complexity Score

(-1) one

(-2) two

(-3) three or more

(0) don't know

Knowledge Score

2 if correct

0 if wrong or don't know

* 16. How frequently do you have to take each type of pill? (Make one
** tick for each type).

Complexity Score

-1 once a day

-2 twice a day

-3 three or more times a day

0 don't know

Knowledge Score

2 if correct

1 if wrong or don't know

17. How long have you been on lithium since the first time you were prescribed it?

(4) less than a year

(3) 1 - 2 years

(2) 2 - 3 years

(1) over three years

(0) don't know

* When scoring allow a number for each type of pill mentioned.

** Responses to these questions were confirmed with medical records.

....Question 18

18. Are there any reasons you might not follow your doctor's advice to take lithium?

(0) yes

(2) no

If yes, please tick the reasons that are applicable:

( ) unpleasant side effects

( ) not satisfied with my doctor

( ) I don't understand why I should take it

( ) I don't think I need it anymore

( ) I don't think it works for me

( ) It is too complicated to take

( ) I sometimes forget to take it

( ) My family or friends convince me I don't need it

( ) It slows me down too much

( ) I miss my highs

( ) I have difficulty getting my prescriptions filled

( ) I don't like having any blood samples taken off

( ) Other (please specify)

-1 point for each tick

---

19. How do you find having to take lithium daily?

3 : 2 : 1 : 0

not bothersome — extremely bothersome

20. Does it bother you that your moods could be controlled by lithium?

(0) yes

(2) no

21. How do you find talking to other people about having manic depression?

-3 : -2 : -1 : 0 : 1 : 2 : 3

extremely difficult — neutral — extremely easy

22. How does the idea of returning to hospital make you feel?

0 : 1 : 2 : 3

not uncomfortable — extremely uncomfortable

23. How easy have you found it to accept that you have manic depression?

-3 : -2 : -1 : 0 : 1 : 2 : 3

extremely difficult — neutral — extremely easy

24. What doctor(s) have you been seeing in the last 12 months about your manic depression - discussing the disorder, getting prescriptions etc. (Please write names and locations)

_____

_____

_____

If more than one, who is the more important to you regarding treatment of your manic depression.

25. How long have you been a patient of his/hers?

(1) less than 1 year

(2) longer than 1 year

(0) don't know

The next questions 26-36 refer to the doctor most important to you for your manic depression.

26. Tick five words which best describe your doctor's attitude towards you.

( )	cold	( )	rejecting	Scoring: Allow
( )	good natured	( )	respectful	1 point for each
( )	helpful	( )	superficial	positive descrip
( )	indifferent	( )	sympathetic	tion and none for
( )	insincere	( )	understanding	negative descrip-
( )	obliging	( )	unfriendly	tions.
( )	impatient	( )	unsupportive	
( )	reassuring	( )	warm	

27. Tick five words which best describe your doctor's treatment of your manic depression?

( )	attentive	( )	inexperienced	Scoring:
( )	competent	( )	knowledgeable	Allow 1 point for
( )	confident	( )	proficient	each positive
( )	efficient	( )	skilled	description and
( )	ignorant	( )	slack	none for negative
( )	inattentive	( )	sloppy	descriptions.
( )	incompetent	( )	thorough	
( )	inefficient	( )	unskilled	

28. What degree of support and encouragement does your doctor give you for your manic depression?

0 : 1 : 2 : 3

not supportive — extremely supportive

29. How much confidence do you have in your doctor?

0 : 1 : 2 : 3

no confidence — a great deal of confidence

30. Does your doctor spend enough time with you at each consultation?

(1) yes

(0) no

31. How satisfied are you with the level of communication between your doctor and yourself?

-3 : -2 : -1 : 0 : 1 : 2 : 3

extremely unsatisfied — neutral — extremely satisfied

32. After talking to your doctor about your problems, how satisfied are you with the amount of feedback he gives you?

-3 : -2 : -1 : 0 : 1 : 2 : 3

extremely unsatisfied — neutral — extremely satisfied

33. How approachable has your doctor been when you have wanted to discuss your lithium, e.g. side effects etc.

-3 : -2 : -1 : 0 : 1 : 2 : 3

extremely unapproachable — neutral — extremely approachable

34. Does your doctor explain instructions to you clearly, making sure you understand them?

(1) always

(0) usually

(-1) never

35. Which description best describes the relationship you have with your doctor?

(1) your doctor takes the major responsibility for any decisions made and your responsibility is in co-operating with these decisions

(2) both your doctor and yourself have approximately equal responsibility in any decisions made

36. Are you satisfied with this relationship?

(2) Yes

(0) No

37. If you are working in a job, whether paid or voluntary, what do you think the consequences would be if you were hospitalised for your manic depression?

(-2) my job would probably be kept open for me

(2) my job probably would not be kept open for me

( ) other (please specify) Code accordingly

(0) N/A

38. What is your current living situation?

(1) live by yourself

(2) live with other family members

(3) live with others (not family) e.g. flatting

( ) other (please specify) Code accordingly

39. Are you satisfied with your current living situation?

(2) yes

(0) no

40. Do the others you live with know you have manic depression?

(3) yes

(2) no

(1) some

(0) N/A

41. In general what degree of support for your manic depression do you receive from those you live with?

-1 : 1 : 2 : 3

no support — a great deal of support

(0) N/A

42. What effect would it have on your present living arrangements if you experienced an episode of mania?

0 : 1 : 2 : 3

not disruptive — extremely disruptive

43. What effect would it have on your present living arrangements if you experienced an episode of depression?

0 : 1 : 2 : 3

not disruptive — extremely disruptive

44. What degree of support for your manic depression do you receive from family members.

-1 : 1 : 2 : 3

no support — a great deal of support

(0) N/A

45. What effect would it have on your family if you experienced an episode of mania?

-1 : 1 : 2 : 3

(0) N/A — not disruptive — extremely disruptive

46. What effect would it have on your family if you experienced an episode of depression?

-1 : 1 : 2 : 3

(0) N/A — not disruptive — extremely disruptive

47. Do you belong to a support group for your manic depression?

(2) yes

(0) no

If yes, what is it's name (please specify) (1) M.D.S.

(2) A.A.
(3) GROW
(4) Hospital Psychotherapy Group
(5) Church Group

48. How long have you been a member of it?

(1) less than 6 months
(2) 6 months to 1 year
(3) 1 - 2 years
(4) over 2 years
(0) N/A

49. How frequently does your group meet? (Please specify) (1) two or more times a week

(2) weekly
(3) fortnightly
(4) monthly

(0) N/A

50. How frequently do you attend?

(3) at least twice out of every three meetings
(2) about once every two meetings
(1) less frequently than once every two meetings
(0) N/A

51. How well do you feel the meetings help you cope with your manic depression?

-1 : 1 : 2 : 3

(0) N/A — not helpful — extremely helpful

52. The term 'significant other' is applied to someone who is important to you and influences your behaviour in either a positive or negative way. Label up to 5 people who you consider to be a significant other in your life, using the letters A, B, C, D & E. (The letters do not indicate any particular order).

Mother
Father
Husband
Wife
Sister(s)
Brother(s)
Boss
Fellow workers
Friend(s)
Boyfriend
Girlfriend
Doctor
Psychologist
Support Group Members
Children
Flatmate(s)
Other (specify)

Scoring: Allow 1 point for each letter

53. What degree of support and understanding does each person provide you with? (Put letter of each significant other beside appropriate response. More than one letter can be put beside each choice).

3 a great deal of support
2 some support
1 little support
-1 no support

Scoring: Add up each individual letter to a maximum score of 15, and minimum score of -5.

54. Where does each person stand with respect to checking whether or not you take your lithium?

1 they nag me about it
1 they often ask if I have taken it
1 they ask questions only if they feel something is different
0 they don't ask questions, but leave the responsibility for taking my pills up to me.
0 they don't know I have manic depression
other (please specify) code accordingly

Scoring: Add up each individual letter to a max.of 5 and min. of 0.

55. How noticeable would it be to each person if you had not taken your lithium for 5 days?

3 extremely noticeable
2 quite noticeable
1 slightly noticeable
-1 not noticeable
0 don't know

Scoring: The same as Question 53

56. How important do you think it is to each person that you take your lithium regularly?

3 extremely important
2 quite important
1 slightly important
-1 not important

Scoring: The same as Question 53

57. What is your personal feeling towards the use of medication for treating psychological disorders?

-3 : -2 : -1 : 0 : 1 : 2 : 3

intense personal dislike — neutral — strong personal liking

58. What part does medication play in helping you cope with manic depression?

0 : 1 : 2 : 3

not important — extremely important

59. In the last two weeks, have you ever missed a dose of lithium?

(0) no

( ) yes → Scoring: once number of missed pills is determined, using question 14, the level of noncompliance is expressed as a percentage.

If yes, how many times? _____

60. In the last two weeks, have you always taken your lithium at the times of day you were instructed?

(0) no

(2) yes

61. In the last two weeks, have you taken the number of lithium prescribed each day?

( ) no

(2) yes

If no, did you take more? (1) or less? (-1)

62. How important is it to you to take your medication as directed by your doctor?

0 : 1 : 2 : 3

not important — extremely important

63. When did you last have a blood test to check your lithium levels?

(2) within the last ~~month~~ 2 weeks

(2) ~~2-3 months ago~~ 2 weeks - 3 months ago

(0) over 3 months ago

64. Have you ever taken yourself off lithium without your doctor's knowledge.

(0) yes

(2) no

If yes, how many times have you done this?

(1) once

(2) more than once

(0) N/A

If yes, for how long on average?

(1) 1 weeks or under

(2) over 1 week

(0) N/A

65. When did you do this?

(0) N/A (3) prior to this last year as well as during the year

(2) within last year only

(1) over 1 year ago and not since.

66. What were the general consequences of having done this?

(0) N/A

(1) Showed no awareness of detrimental consequences

(2) Recognised the detrimental consequences of noncompliance.

APPENDIX 6

KUCERA - BOZARTH SELF-REPORT

SELF-REPORTED LITHIUM COMPLIANCE QUESTIONNAIRE

In the last two weeks,

1. Did you ever miss a dose of lithium?

   No ( )

   Yes ( )

   If yes, how many times? _____

2. Did you take your lithium at the times of day you were instructed?

   No ( )

   Yes ( )

3. Did you take the number of lithium prescribed each day?

   No ( )

   Yes ( )

   If no, did you take more? ( ) or less? ( )

4. Are there any reasons you might not follow your doctor's advice to take lithium?

   No ( )

   Yes ( )

If yes, please check the reasons:

( ) unpleasant side-effects

( ) not satisfied with my doctor

( ) costs too much

( ) I don't understand why I should take it

( ) I don't think I need it anymore

( ) I don't think it works for me

( ) it is too complicated to take

( ) inconvenient outpatient clinics

( ) my family or friends convince me I don't need it

( ) it slows me down too much

( ) I miss my "highs"

( ) difficulty getting my prescriptions filled

( ) I don't like having my blood samples drawn

( ) other_____

_____

_____

_____

_____

_____

5. Lithium has been effective as a medication in my treatment. (Circle the number that best describes your opinion.)

1	2	3	4	5	6
strongly agree	moderately agree	mildly agree	mildly disagree	moderately disagree	strongly disagree

MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL SCALES

The purpose of this third section is to learn more about individual attitudes towards health. In particular I would like to know what you think may or may not influence your health.

This questionnaire is a list of 18 brief statements. You choose a response to each statement that best describes how you feel about that statement. The response choices range from 'strongly disagree' (scored as 1) to 'strongly agree' (scored as 6). Circle the number that best describes what you think now. Obviously, there are no right or wrong answers.

Please circle a response for each statement.

---

1. If I get sick it is my own behaviour which determines how soon I get well again.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

2. No matter what I do, if I am going to get sick, I will get sick.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

3. Having regular contact with my physician is the best way for me to avoid illness.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

4. Most things that affect my health happen to me by accident.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

5. Whenever I don't feel well I should contact a medically trained professional.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

6. I am in control of my health.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

7. My family has a lot to do with my becoming sick or staying healthy.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

8. When I get sick I am to blame.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

9. Luck plays a big part in determining how soon I will recover from an illness.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

10. Health professionals control my health.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

11. My good health is largely a matter of fortune.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

12. The main thing which affects my health is what I myself do.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

13. If I take care of myself, I can avoid illness.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

14. When I recover from an illness, it is usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

15. No matter what I do, I am likely to get sick.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

16. If it is meant to be, I will stay healthy.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

17. If I take the right actions, I can stay healthy.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

18. Regarding my health, I can only do what my doctor tells me to do.

1	2	3	4	5	6
strongly disagree	moderately disagree	mildly disagree	mildly agree	moderately agree	strongly agree

APPENDIX 8

SCORING PROCEDURE OF

HEALTH LOCUS OF CONTROL ITEMS WITHIN M.H.L.C. SCALES

(FORM A)

Scale	Items
Internal HLC	1, 6, 8, 12, 13, 17
Powerful others HLC	3, 5, 7, 10, 14, 18
Chance HLC	2, 4, 9, 11, 15, 16

Add the raw scores of each of the three dimensions, then calculate a standardized score for each raw score. The highest standardized score indicates the health locus of control held by the individual.